NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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IBM to stage systems, net mgmt. blowout

BY MICHAEL COONEY

Raleigh, N.C.

IBM this week will announce a software package that simplifies the task of automating systems and network management control functions — at a cut-rate price.

The company will also come out with new versions of its NetView Distribution Manager (DM) software distribution system for Novell, Inc. NetWare and OS/2 environments, as well as a new version of its Trouble Ticket/6000 application that works with additional databases.

Targeted at its largest customers, IBM's new Sysplex Operations Manager is a package of three systems automation and monitoring tools for networked mainframes. Whereas today users have to buy copies of each of the

See **IBM**, *page 64*

Management splash

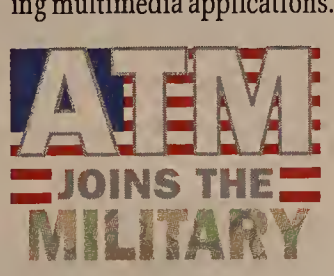
IBM intends to drive down enterprise network operational costs with new host-based systems automation tools, improved NetView/6000 distributed network management wares and software distribution products for NetWare and OS/2 environments.

U.S. Army mobilizes to deploy massive ATM net

BY ELLEN MESSMER

Washington, D.C.

In what may be the most ambitious Asynchronous Transfer Mode project revealed to date, the U.S. Army has begun deploying the technology at bases across the country to link existing LANs and support emerging multimedia applications.



The project initially will involve the installation of ATM metropolitan-area networks at individual bases but eventually will entail linking these ATM islands.

The ATM metropolitan nets will let the Army preserve its investment in local-area network technology while enabling the exchange of intelligence, medical, financial, logistical and administrative data at much higher speeds than is possible over existing Fiber Distributed Data Interface rings.

The Army's foray into ATM territory began last month with the installation of an ATM metropolitan-area network at Ft. Bragg in North Carolina. Work on a similar backbone at Ft. Hood in Texas will begin within a few weeks, and an unspecified number of other bases will migrate to ATM after that.

At both Ft. Bragg and Ft. Hood — essentially small cities running their own networks — a star-based ATM net will link Ethernet, token-ring and FDDI nets. Previously, few of the LANs supporting the more than 8,000 buildings at the two sites could communicate with one another.

The Army's Information Systems Command, which installs and operates nets worldwide, deter-

See **Army**, *page 65*

WALTER CALAHAN

From left, U.S. Army's Frank Dawson, Lt. Col. Greg Swanson, Bill Ryberg, John Staples

Internet users to pay if IP resellers don't

BY ELLEN MESSMER

Washington, D.C.

Commercial Internet users beware: Depending on the service provider you use, your traffic may soon be sent to a cyberdump.

The organization managing the main commercial Internet connection point has decided to filter out traffic from any reseller that does not pay a $10,000 membership fee by Nov. 1.

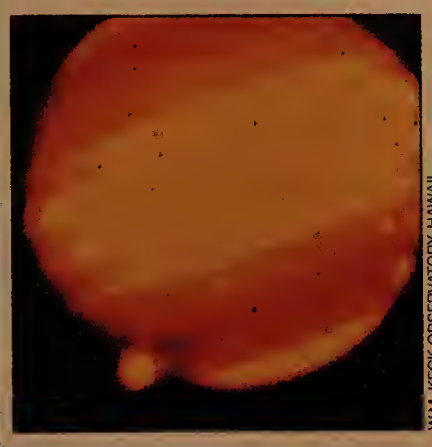
As word got out last week about the secret vote by the five-member Commercial Internet Exchange (CIX) board, the Internet community broke into debate over the role of Internet Protocol service resellers as well as what exactly constitutes an IP reseller.

CIX is a cooperative of 60 IP service providers, 17 of which have physical connections to the Cisco Systems, Inc. 7000 router that serves as the country's main commercial Internet gateway. The remaining 43 use the connected IP providers for transport.

The CIX has not officially announced the new policy of blocking IP

See **Internet**, *page 4*

Boom!



W.M. KECK OBSERVATORY, HAWAII

Users flocked to the Internet last week to obtain infrared images like this one showing Jupiter getting hit by comet fragments. See story on page 10 about how the 'Net withstood the demand.

NEWSPAPER

TOO

ORACLE ISVs

Database monitoring tools on tap

BY BARB COLE

Two small Virginia-based software houses are readying tools to help users centrally manage distributed Oracle Corp. databases, an area in which Oracle itself offers few options.

Information Systems Group, Inc. (ISG), a Richmond, Va., developer of database administration tools, next month will announce a Windows-based program for managing and tuning distributed Oracle and Digital Equipment Corp. databases.

Meanwhile, Reston, Va., software development firm Digital Analysis Corp. is testing a beta version of a Simple Network Management Protocol agent that will enable users to manage Oracle databases via Hewlett-Packard Co. OpenView and IBM NetView/6000 management stations.

These tools are among a growing

See **Oracle**, *page 64*

Users get second shot at sweet AT&T deals

BY DAVID ROHDE

Washington, D.C.

Missed your chance to tag along on someone else's juicy AT&T contract tariff deal because you didn't know about it? You may well get another shot.

AT&T has quietly begun reopening the availability windows of contract tariffs, giving users a new chance to buy into discounted offers for the carrier's most popular services without having to negotiate special deals.

Contract tariffs take regular AT&T offerings — such as Megacom switched services, Accunet private lines, Software-Defined Networks and UniPlan mid-market services — and ladle out extra discounts and fee waivers to individual customers.

To satisfy legal requirements, AT&T files these deals at the Federal Communications Commission with the proviso that "similarly situated customers" can order up the same deal.

The hitch has been that the availability window typically shuts after 90 days. And with

See **Tariff**, *page 6*

Ready to switch?

Ethernet switches from Alantec, Kalpana and LANNET prove they ease congestion and improve performance, but one size doesn't fit all. Page 47.

Briefs

An escrow account. While not backing away from the controversial Clipper Chip key escrow system, Vice President Al Gore said last week that the administration would be willing to help develop a similar system for private users that does not rely on a classified algorithm. The Business Software Alliance called the statement a victory for anti-Clipper Chip computer makers, but Washington, D.C.-based public interest group Electronic Privacy Information Center said government and industry should not be designing key escrow systems that weaken security and privacy rights.

Let's put it to a vote. The 100VG-AnyLAN specification for running Ethernet and token-ring networks at 100M bit/sec took a step closer to final standard status when the IEEE 802.12 working group last week decided to forward the draft specification to a 30-day letter ballot. The decision means the standard is stable enough for vendors to begin releasing products based on the technical contents of the spec. The IEEE 802.3 working group last week also voted to send its competing 100Base-T specification to a letter ballot.

Cutting back. KnowledgeWare, Inc., once a leader in the computer-aided software engineering market, is now a struggling vendor in the client/server tool market. The Atlanta company last week announced that it was laying off 240 of its 947 workers to cut costs.

Spanning the gap. Eastern Research, Inc. last week introduced the SpanNet Bridge/Router for Ethernet connectivity over the wide-area. SpanNet includes a single local-area network port and two wide-area network ports that can be configured with a V.35/RS232 serial interface, a switched or dedicated 56K bit/sec data service unit/channel service unit (DSU/CSU), or a full/fractional T-1 DSU/CSU. It supports frame relay and can load-balance across the two WAN ports. Available now, SpanNet costs $1,995.

Eastern Research: (215) 364-7955.

Modem this. U.S. Robotics, Inc. last week announced a complete line of 28.8K bit/sec V.34 modems. Offerings include desktop, portable, PCMCIA and rack-mountable data center modems, as well as V.34-based remote access products. The Courier desktop version will ship in mid-August, with others to follow by year end. Pricing was not disclosed.

U.S. Robotics: (800) 342-5877.

Six-headed company. The sextet that will lead the new billion-dollar company coming out of Wellfleet Communications, Inc.'s acquisition of SynOptics Communications, Inc. was formally unveiled last week. In addition to Paul Severino, who will be chairman of the board, and Andy Ludwick, who will act as president and chief executive officer, the new company's board of directors will include: Wellfleet's Gary Bowen as executive vice president of field operations and marketing; Wellfleet's Steve Chehyl as executive vice president of business operations; SynOptics' Bill Ruehle as executive vice president and chief financial officer; and SynOptics' Ron Schmidt as executive vice president and chief technology officer.

Database dough. Oracle Corp. recently paid $10 million for a small share of Gupta Corp. Oracle acknowledged that it has begun merger talks with Gupta. A merger would give Oracle a suite of development tools in the form of Gupta's SQLWindows and give Gupta better ammunition in its battle with tool vendor Powersoft Corp.

Telecom togetherness. The International Communications Association (ICA) has decided to merge its annual exhibition with that of the Supercomm show, sponsored by the Telecommunications Industry Association and U.S. Telephone Association. The first combined event will run March 20 to 23 next year in Anaheim, Calif. ICA and Supercomm will still target separate audiences with conference sessions, which will be during the same week and at the same location as the exhibitions.

Contacts

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LAN WORLD

Network General expected to release a report generation application that will help manage vast amounts of Sniffer-collected data. *Page L1.*

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FEATURE

In a Nutshell

SQL Access Group's Merrill Holt cracks open the mysteries of the Call Level Interface. Page 53.

Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1103, via fax at (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.*

We are looking for software to send encrypted transmissions to and from a DOS, Windows or OS/2 PC to an IBM ES/9000 host. Are there products available that run on the host and are compatible with the other platforms?

S.M., Winston-Salem, N.C.

Jonathan Wheat, a security consultant at the National Computer Security Association, a Carlisle, Pa.-based organization that promotes security awareness to microcomputer and network users, replies:

You might want to check out AT&T's SecretAgent 3.0 encryption software, available for DOS, Windows, Macintosh and Unix platforms. According to an AT&T spokesperson, SecretAgent for OS/2, minicomputer and mainframe systems can also be developed at a customer's request.

SecretAgent combines a software implementation of the Data Encryption Standard with public-key encryption technology. Single-unit pricing for SecretAgent starts at $249.95 per CPU for commercial customers and $149.95 per CPU for government customers.

Quantity discounts and site licenses are also available. For more information on SecretAgent, call AT&T's Secure Communications Products at (800) 203-5563.

Another solution is RSA Data Security, Inc.'s Toolkit for Interoperable Privacy-Enhanced Messaging (TIPEM), which allows programmers to develop secure, interoperable messaging, workflow and forms applications using encryption and digital signature technology. TIPEM uses Public Key Cryptography Standards, so generating an encrypted message on one system would allow another system to decrypt it. The tool kit costs $450. For more information about TIPEM, call (415) 595-8782.

Do you know of any a terminate-and-stay-resident (TSR) programs that can reboot a workstation if a Novell, Inc. NetWare connection is lost?

Lars Beijar, Stockholm, Sweden

See **Help desk,** *page 54*

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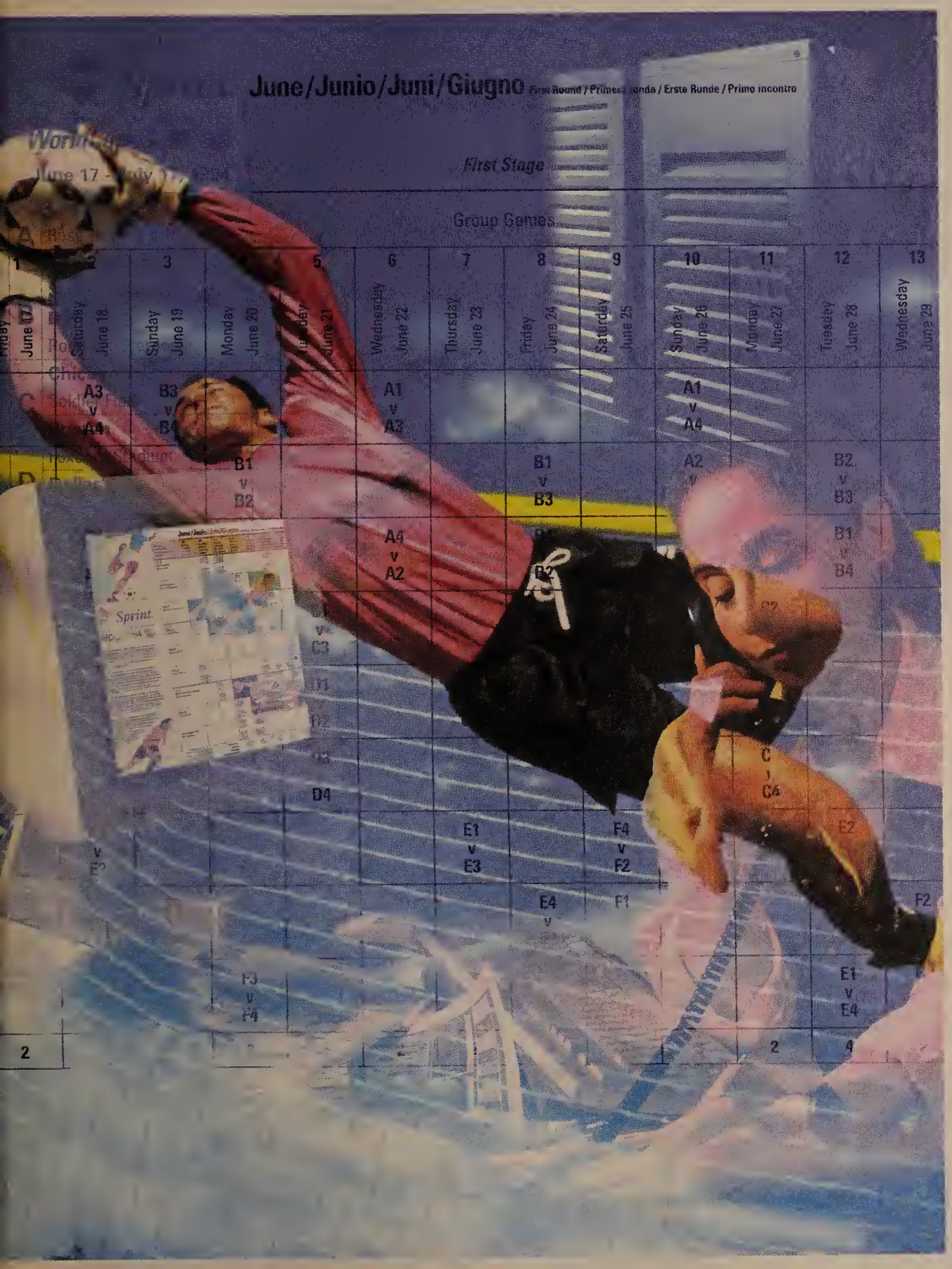

Sprint Technology Achieves World Cup USA 1994 Goals

It takes a company with vision, drive and experience to handle communications for soccer's greatest tournament. The company is Sprint — official long distance provider for World Cup USA 1994.

Sprint's advanced data and voice applications give more than 8,000 international journalists real-time access to a vast database of player profiles, photos and statistics to enrich their coverage.

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Plus, Sprint teleconferencing, interactive 800 service and an on-line concession sales information system make this one of the most technologically advanced sports events in history.

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Call 1-800-669-4700 to find out more.

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Microsoft free at last?

Ruling still lets firm incorporate apps in its OSes.

BY MICHAEL CSENGER AND ADAM GAFFIN

Washington, D.C.

The antitrust settlement Microsoft Corp. reached with the Justice Department skirted an issue central to network users, paving the way for the software giant to continue integrating applications with its desktop and network operating systems.

The consent decree, announced July 16, focused almost entirely on the way Microsoft sold operating systems to hardware vendors. But it does not prevent the company from integrating applications into the operating system itself.

Competing software vendors such as Lotus Development Corp. had long alleged that Microsoft's applications division received unfair information from its operating systems division that gave the company a leg up on the competition.

Some analysts and users said the decree, which also poses stricter controls on the royalties Microsoft can collect from personal computer vendors, leaves the path clear for Microsoft to mop up competitors that sell stand-alone applications, resulting in more limited user choice down the road.

Industry insights

"Many application developers think their industry is gone."
— Frank Dzubeck

"I've been waiting with bated breath for Microsoft to get its act together in the networking world."
— Frank Caro

SKEPTICISM

But others said Microsoft has yet to prove to the market that it has operating systems and networked applications worth betting a business on.

"A lot of its networking products are either futures or first-generation products," said Jamie Lewis, president of The Burton Group, a Salt Lake City consulting firm. The company faces entrenched and growing user bases for both Novell, Inc.'s NetWare operating systems and Lotus' Notes groupware applications, he said.

Users also expressed skepticism.

"Microsoft promises Chicago and Cairo and a whole lot of networking, but the question is, will it work before they run out of cities to name these things after?" quipped a network manager whose major brokerage house network runs on Unix.

Windows NT is not a truly open environment, he said, "Because if Gates doesn't have it then neither do you, and I'd rather not put myself in his hands. That's why we've standardized on Unix for our trading floor."

Frank Caro, technology transition team leader for Otis Elevator Co. in Farmington, Conn., cited interoperability problems with Microsoft's current Windows implementation of Transmission Control Protocol/Internet Protocol as an example of the company's network shortcomings.

"We've been trying to get into the networking capability of Microsoft's products and find there's one common theme: NETBIOS," Caro said. Microsoft does not yet support native TCP/IP, but uses NETBIOS or NETBEUI encapsulated within TCP/IP, he said.

"We're totally uninterested in any approach like this; it can't handle a network of more than 50 users and is terrible over the wide area," Caro said.

And Windows NT has proved unable to handle the applications that Otis wants to take off its mainframe system, because Windows NT is not a multiuser environment.

But Caro respects Microsoft's ability to change course as necessary and awaits the promised native TCP/IP support in Chicago.

"That one feature alone is going to cause dramatic change in network connectivity," said Nick Lippis, principal at Strategic Networks Consulting, Inc. in Rockland, Mass., referring to Windows' TCP/IP.

Native TCP/IP support for Chicago could help Microsoft cut into Novell's installed NetWare client base by providing an alternative to Novell's Internetwork Packet Exchange (IPX) protocol. If the desktop operating systems supported TCP/IP directly, "why continue with IPX?" Lippis asked.

NOVELL NOT WORRIED

"I laugh when I hear people say it's all over for Novell now, we should pack up and go home," said David Bradford, vice president and general counsel for Novell.

"Microsoft has come against Novell [several] now with their networking products, and we've beat them every time," Bradford said.

Bradford also noted that this consent decree does not close Microsoft's books forever. "They will be monitored, perhaps even more so than before," he said. "The industry and consumers have an ally in the Justice Department."

Frank Dzubeck, president of Communications Network Architects, Inc., in Washington, D.C., agrees that the case may not yet be closed.

"If Microsoft gets very aggressive and starts burying things in their operating systems, then this whole issue will be revisited," he said. "But it will require that another company first go bankrupt."

Comments?

See "Contacts" box on page 2.

MCI poised to launch managed router service

BY JOANIE WEXLER

MCI Communications Corp. plans to launch its flavor of a managed router service as early as this week.

Knowledge Services, MCI's answer to AT&T's Extended Connectivity Option Plus, Sprint Corp.'s Managed Network Services and other vendors' offerings, will be available initially for customers of Hyperstream, MCI's frame relay service.

It will provide the following options, according to sources familiar with the service:

- Choice of Cisco Systems, Inc. and Wellfleet Communications, Inc. routers. By comparison, Sprint offers the same choices, AT&T handles Cisco routers only, and WilTel offers a choice of Cisco, Wellfleet or 3Com Corp. routers.
- Ability to purchase both equipment and management services from MCI or buy the routers themselves and farm out management only.
- Aggressive pricing at less than $200 per node per month.
- Ability to relinquish configuration and management of the local-area network side of their routers.

Sprint and AT&T also offer to take charge of the LAN side of the router, while other competitive offerings, such as MFS Datanet, Inc.'s High-speed LAN Interconnect service, only manage up to the router's wide-area port.

Relieving users of LAN router table configuration and maintenance can be a boon to network managers looking to unload time-consuming operational duties in favor of strategic activities, analysts said.

"People spend more time on router maintenance than any other function in the data communications shop. They're glad to give it up," said Joe Noel, general manager of telecommunications research at IntelliQuest, Inc., an Austin, Texas, research firm.

"Knowledge Services will reduce our investment in in-house expertise," said Craig Wielkotz, project manager for wide-area networking at MCI shop MetPath, Inc., a clinical laboratory in Teterboro, N.J., that has run a router-based WAN for less than a year. "My main job should be managing MCI."

Other customers feel differently. Burt Treger, network operations manager at MCI shop SUNTRUST Service Corp. in Atlanta, said, "We've invested in our own training to do that, so outsourcing-oriented services have no appeal. For companies without that expertise, though, this could be a valuable offering."

Users at companies with large term and volume discounts for equipment from a certain vendor could find it worth their while to procure the routers themselves and opt for MCI management only, said Christine Heckart, a senior consultant at TeleChoice, Inc., a consultancy in Verona, N.J.

"But if you don't stand to gain substantially on equipment pricing, from an overall cost standpoint, it is usually less expensive to let one vendor handle everything," she said.

Like most of its competitors, MCI will proactively monitor the routers 24 hours a day or give the user the option of issuing trouble tickets.

Five large customers are reportedly already up on MCI's Knowledge Services with configurations of 20 to 50 routers. Each customer is assigned a consultant who is responsible for understanding the user's business requirements, applications, protocols and equipment topology, as well as for designing the network and optimizing the design on an ongoing basis.

An MCI spokesman would say only that he was "99% sure we will announce a managed router service" this week.

Internet

Continued from page 1

resellers that do not pay the $10,000 CIX membership fee. But last week CIX board member Rick Adams, chairman and chief operating officer at UUNET, Inc., which offers an IP service called Alternet, confirmed that IP resellers have 60 days to pay up or else their traffic will be blocked.

"If CIX does this, users may find that their packets don't go through," said Glenn Tenney, an analyst with San Mateo, Calif.-based consultancy Fantasia Systems, Inc. "A big part of the question is universities. A lot of universities sell IP ad-dresses."

The CIX board has not yet issued a precise definition of an IP reseller, also called a "downstream provider." The debate last week suggested a reseller could include any group that buys access to leased lines from a larger IP provider, resells IP addresses or even provides multiple users access to a single Internet address under "shell accounts."

"Universities that have been selling IP addresses — they're certainly resellers," Adams said.

Another CIX board member who voted in favor of the CIX plan, Martin Schoffstall, chief technical officer at Performance Systems International, Inc. (PSI), said long-established CIX rules require members to prevent IP reseller traffic.

"Everyone agreed years ago that IP resellers would have to join the CIX if they wanted to use it," he said.

Sprint, the one CIX board member to vote against the decision, last week would only say that it would adhere to the board's decision.

During the last two years, the number of small and large IP resellers has skyrocketed, defying CIX control. According to Ann Arbor, Mich.-based consultancy The Maloff Company, IP resellers now constitute a $15 million business, with the first IP reseller, The World service provided by Software Tool and Die, Inc., making the top 10 list of IP resellers (see graphic).

U.S. full Internet service mart*

Service provider	Annual revenue (in millions)
PSI	$15.24
Alternet	$14.76
SprintLink	$14.38
AN&S	$10.48
NETCOM Corp.	$8.89
CERFNet	$4.47
Colorado Supernet	$4.20
NEARNET	$3.50
World	$3.24
BARRNet	$2.90

*Consists of IP access, including FTP, Telnet, E-mail and World-Wide Web support.

SOURCE: THE MALOFF CO., ANN ARBOR, MICHIGAN

Barry Shein, president of Brookline, Mass.-based Software Tool and Die, fiercely objected to the categorization of his company as an IP reseller. The World is a point of presence on UUNET and sells users (including *Network World*) shell accounts based on Alternet addresses, he said. But Shein added that he may pay the $10,000 CIX membership fee anyway.

CIX members defending the plan claim that the flat-rate $10,000 fee preserves a system under which both small and large providers can exchange packets on an even playing field, without charging settlement fees based on numbers of packets exchanged.

But critics of the CIX filtering plan say it is an attempt by an oligopoly of midsize veteran IP providers like PSI and UUNET to hold on to their lead against both the telecommunications giants and the onrush of newcomers opening IP reseller shops with a $5,000 investment.

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When it comes to high-performance hubs, the new DEChub™ 900 MultiSwitch is a whole different animal. It's the most flexible and cost-effective hub around. For starters, its technology-independent backplane supports Ethernet, Token Ring or FDDI in any slot — up to eighteen separate LAN segments. Over 3GB of throughput gives you all the bandwidth you'll ever need. It's ATM-ready today. All DEChub 900 modules and the award-winning DEChub 90 modules work as single units or snapped into the DEChub 900 backplane.

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AT&T leads industry in simplified T-1 pricing

BY JOANIE WEXLER

Basking Ridge, N.J.

AT&T last week filed a revamped tariff for its T1.5 Accunet service that makes it easier to calculate circuit costs and reduces prices by as much as 3% in heavy-usage corridors.

About half of AT&T's T-1 customers, though, will see a 1% to 2% increase in their monthly bills under the tariff, which lists prices between pairs of U.S. cities, said Larry Lang, Accunet product manager.

The tariff replaces one requiring a more complex calculation on the part of users, who needed to know the local exchange — called the NPA/NXX — of the AT&T central office at each end of a T-1 link. They also had to figure the intercity mileage as the crow flies.

But some users said they would rather save on the bottom line.

"City-pair pricing is not important to us. We don't have thousands of T-1s, so it's not that complicated to figure out pricing," said Plato Demos, manager of telecommunications infrastructure development at Union Carbide Corp. in Danbury, Conn.

"What we care about is cost — even a 1% to 2% increase is important to us."

Observers were divided as to the significance of the industry-leading move to overhaul the price structure of T-1 services.

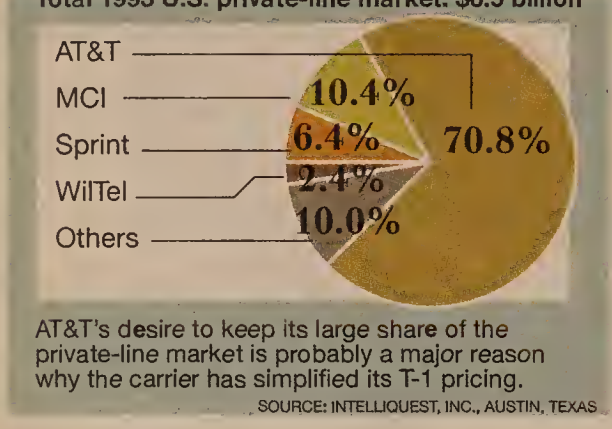
"I think this is a great first step that could spur all carriers to be more open about pricing" on T-1, frame relay, DS0 and other services, said Christine Heckart, a senior consultant with TeleChoice, Inc., a Verona, N.J.-based consulting firm.

Heckart called the NPA/NXX price-figuring method "a pain in the rear end because you need a special tool." The old method meant figuring out airline mileage between cities, multiplying the number of miles by $3.95 and adding that figure to $2,800.

"I don't think users care about that; most T-1 users have established techniques for determining prices," said Steve Sazegari, senior consultant at Ryan Hankin Kent, a consulting firm in South San Francisco, Calif. He indicated that simpler T-1 pricing might be a move to preserve AT&T's huge private-line customer base (see graphic) as frame relay services erode that base.

Much at stake

Total 1993 U.S. private-line market: $6.5 billion



AT&T's desire to keep its large share of the private-line market is probably a major reason why the carrier has simplified its T-1 pricing.

SOURCE: INTELLIQUEST, INC., AUSTIN, TEXAS

Tariff

Continued from page 1

the volume of contract tariffs on file — 1,381 as of last Monday — few, if any, users have been able to move fast enough to catch the ride.

But AT&T last week reopened the availability windows on three contracts — two for UniPlan and one for Megacom, all including provisions for Accunet T-1 local channels — after changing the language to raise the minimum commitment or enrich the terms.

Users should take advantage of this opportunity, said Larry Gessini, director of telecommunications for Agway, Inc. in Syracuse, N.Y., and past president of the International Communications Association. "If the package that's out there fits your requirements, why reinvent the wheel?" he asked.

The new terms for these contract tariffs can provide even bigger discounts than previously available deals for AT&T services (see graphic).

AT&T is reopening the windows because older contract tariffs with two- or three-year terms are nearing their expiration dates, and the original customers need the availability window as a mechanism to resign, an AT&T spokesman said.

Asked whether that meant more contract tariffs would be reopened as they near expiration, the spokesman responded: "It's very likely."

Most contract tariffs have to be renegotiated prior to expiration because they do not have automatic renewal options, said George David, publisher for the Center for Communications Management Information (CCMI), a tariff analysis firm in Rockville, Md.

"An awful lot of these are going to become available to others," he said.

Even a reopened window of 90 days may be too short for some, however. "It's kind of like catching a freight train," said Ted Sickles, data network director for Rockwell International Corp. in Seal Beach, Calif.

Tariff firms such as CCMI and Valucom, Inc. of Vienna, Va., can help users find out about contract tariff availability windows. CCMI, for example, has launched a $695-a-year fax service called Contract TariffAlert that each week gives users the essential terms of newly filed AT&T contract tariffs. The company intends to include special deals from MCI Communications Corp. and Sprint Corp. should they be required to file these deals in the future, David said.

Users have to be careful in examining contract tariffs, though. The rate from which the discounts are calculated are sometimes among the highest in AT&T's arsenal — around 25 cents a minute during peak hours in the case of UniPlan's outbound offering.

And contract tariffs typically include conditions such as limitations on the number of dedicated or switched access lines or provisos that a certain percentage of traffic be international. These so-called monitoring conditions ensure that the mix of traffic is one that AT&T can afford to deep discount "so that we don't lose our shirts," the AT&T spokesman said.

The discount store

Sample price breaks under AT&T's UniPlan for a user committing to $55,000 per month of combined outbound and inbound usage across multiple sites for three years.

Regular volume discount: **17%**

Regular 3-year term discount: **An additional 15%**

Credit on 3rd month's bill: **$60,000**

Credits on 13th, 25th and 36th months' bills:
As much as 15% of the previous 12 months' billings

Waiver of installation charge for:
As many as 4 dedicated T-1 access lines to AT&T POPs

Waiver of all charges on:
Specialized Maintenance Service

Based on:
AT&T Tariff FCC 1 and Contract Tariff 311

3Com enhances its remote access server

BY SKIP MACASKILL

Santa Clara, Calif.

3Com Corp. this week is expected to roll out a suite of enhancements to its remote access server that adds new remote client, security and network management capabilities.

The upgrades to the AccessBuilder line will be highlighted by a new network management application that simplifies the installation, configuration and manageability of the product.

Transcend AccessBuilder Manager will allow users to install the remote access server in about five minutes and enable users to manage multiple AccessBuilders from a single Windows-based personal computer.

"The ability to manage several devices from a single console is a key upgrade that will make it a lot easier for me to manage access for the seven remote offices dialing in to our corporate LAN," said Lee Rich, an AccessBuilder beta user and systems administrator at Electronic Book Technologies, Inc. (EBT) in Providence, R.I. "It's a big improvement on the earlier version, which required a dumb terminal hanging off each AccessBuilder for configuration and management."

3Com will also extend its security offerings by enhancing the AccessBuilder Security Package to support an interface to a Security Dynamics Technologies, Inc. Access Control Encryption security server and Novell, Inc. NetWare Bindery and NetWare Directory Services.

The upgrades compliment existing support for 3Com's AccessBuilder Name Server and the Open Software Foundation, Inc. Distributed Computer Environment Security Services offered on Hewlett-Packard Co. machines.

Enabling the AccessBuilder to support a range of

See **3Com**, *page 64*

CyberSpeak: *Voices from the reader network*

Will "anytime, anywhere" computing and communications ruin summer vacations in the future?

◆"It will if we let it. However, in the next couple of years there will still be plenty of places on this continent that won't be reachable via wireless communications. It's up to us to seek out these havens. I have a feeling that spelunking and solar flare watching will become more popular pastimes!"

Bill Rogers, technology management analyst, CUNA Mutual Insurance, Madison, Wis.

◆"You have got to be kidding! Who has time to take a summer vacation? The fact is that uninterrupted vacations have become a thing of the past for IS professionals. Rather than ruining time off, anytime, anywhere computing allows IS staffers to quickly straighten out the problems from remote sites, rather than spend hours on the phone attempting to walk the uninitiated through the corrective process."

Sandro Silvestri, director, Henry Ford Community College, Dearborn, Mich.

◆"It is possible to leave the pager, the cellular phone or the computer at home or turned off. The people who take along these instant ties to work when they go on vacation may place work at a higher priority than their vacation. The vacations that they risk ruining should be blamed not on the new technology but on the priorities that its users set for their lives."

Marie Martin, research assistant, EPA/NAREL, Montgomery, Ala.

◆"Quite the contrary. I view it as the first step to the realization of a 'Virtual Office.' I see a flexible work environment that allows me to work the way I live, not live the way I work."

Rich Faille, sales consultant, Computervision Corp., Bedford, Mass.

◆"It won't ruin summer vacations, but will be a vacation-enabler. Given slimmer staffing and cross-functional responsibilities, knowledge workers have trouble getting away. The Information Superhighway will enable them to 'virtually commute' from any vacation spot on the globe."

Gere Boyle, enterprise specialist, AT&T Global, Dallas

◆"Not for me. Even if the devices I use don't have an off switch, the silly things still have a battery that can be removed."

Richard Masoner, software engineer, Central Data Corp., Champaign, Ill.

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ATM Forum still fretting over congestion control

BY BILL BURCH

Irvine, Calif.

The ATM Forum last week slogged through debates on a range of technical issues, including a fight over congestion control that could delay release of this key standard until the second quarter of next year.

The group also stumbled on an intercarrier interface for switched circuits that won't be out until the second quarter, either, said Bell Communications Research's George Dobrowski, chairman of the forum's technical committee.

Carriers need solid congestion control before they can handle large numbers of users, and switched virtual circuits (SVC) are critical to the commercial success of Asynchronous Transfer Mode (ATM), so the forum's difficulties here could mean slower progress for ATM in the wide area.

The forum has been fighting over congestion control mechanisms for months, using the user-to-network interface (UNI) specification as a battleground. While the current UNI, Version 3.0, takes step to address congestion, networks still face potential problems if a crush of users come on to a network simultaneously or transmission facilities go down.

To handle such disasters, the forum is weighing the adoption of either a credit-based scheme for handling congestion, an approach backed by Digital Equipment Corp., or a rate-based one, backed by StrataCom, Inc. The group has been closing in on a compromise that would employ the rate-based approach with some of the features from the credit-based scheme, but it has not yet come to terms.

Because congestion control was to have been part of Version 4.0 of the forum's UNI specification, the congestion debate was holding up other work on that standard. To avoid the delay, the forum has taken congestion control out of the current version of the UNI and is now targeting it for Version 5.0.

At the network-to-network level, the forum made some changes to the broadband intercarrier interface (BICI) used to link carrier networks by adding support for permanent virtual circuits and usage measurement between network operators.

The BICI working group also took up SVCs. Switched circuits will soon be supported in the local area via UNI Version 3.1, but switched circuits in the wide area will require agreement on BICI support for switched circuits. But the BICI is lagging behind the UNI, and documentation likely won't be available until the second quarter of next year, the same time a congestion control agreement should be out.

ATM standards update

Congestion control: Delays cause removal from Version 4 of the User-to-Network Interface; will be addressed in Version 5, which will probably be out in the second-quarter 1995.

Broadband intercarrier interface: Permanent virtual circuits and measured usage are ready, but switched virtual circuits will not be out until the second-quarter 1995.

LAN emulation: Progress on initialization, control packets and network management; expect the standard in first-quarter 1995.

Physical layer: Unshielded twisted pair, Category 5 is ready, and unshielded twisted pair, Category 3 is due out by the end of this month.

SOME PROGRESS

Despite the delays, the forum's working groups were able to make progress in other areas. The forum has been especially busy on local network emulation — the ability to support native LAN protocols.

The ATM Forum last week worked on specs for control packets, initialization procedures and network management functions for LAN emulation. An initial specification should be out in September, followed by a nonbinding vote in November. A specification could be out in the first quarter next year.

At the physical layer, the forum approved an interface specification for Category 5 unshielded twisted pair, which can carry traffic at 155M bit/sec for short distances. Category 3 unshielded twisted pair for 51M bit/sec links is not as far along.

CORRECTIONS

In the July 11 issue (page 29), the size of AT&T's Contract Tariff 374, the object of a complaint filed at the FCC by The Furst Group, Inc. in Vincetown, N.J., was misstated. It is a three-year contract with a combined minimum annual commitment for SDN and 800 services that rises from $43 million in the first year to $67 million in the third year.

In the July 18 issue (page 4), the address of Cisco Systems, Inc.'s telnet service on the Internet was incorrectly written. The correct address is ciosys.cisco.com.

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NOVELL.

The Past, Present, and Future of Network Computing.

Novell ships a faster, more reliable version of NetWare 4

BY SKIP MACASKILL

Provo, Utah

Novell, Inc. last week rolled out a new release of NetWare 4 designed to address a number of shortcomings and user concerns.

NetWare 4.02 is said to be more reliable, faster and easier to implement than 4.01 and offers NetWare Directory Services (NDS) enhancements that have users smiling.

"Novell's general direction pleases me because they realize the process has to become much simpler," said Arthur Heigl, director of administrative computing at Johns Hopkins University in Baltimore. "Instead of getting updates piecemeal, like in the past, NetWare 4.02 provides a package of improvements that will make systems administration much easier, especially in the NDS area."

Buying into NetWare 4.02

Number of users	Price
5	$1,395
10	$3,195
25	$4,695
50	$6,295
100	$8,795
250	$15,695
500	$26,395
1,000	$47,995

Those NDS upgrades include:

- Improved synchronization and replication of NetWare directories that allow users to update all directories simultaneously, answering one of the biggest complaints about NDS.
- A simplified NDS setup option that automatically creates a flat-view directory tree, appealing to small and midsize network users.
- A new version of the NetWare Administrator graphical utility that is 200% faster and allows users to print their directory trees.

Other 4.02 features include updated DOS, Microsoft Corp. Windows and OS/2 client software, as well as updated print facilities, easier CD-ROM installation, an improved viewer for NetWare 4 on-line documentation and a NetWare Loadable Module confirmation utility.

"Our chief [Certified NetWare Engineer] sees the ability to print the directory tree as one of the more important improvements," Heigl said. "That capability has already helped in numerous discussions since CNEs don't have to be sitting in front of a screen to go over the tree. The new utilities and better macro packaging have made NetWare 4 easier to use, and Novell's support of this product is getting better all the time."

It is now also easier to set up the directories, said Toby Corey, senior director of marketing for Novell's NetWare Products Division.

"Version 4.02 makes it easy to bring a directory up because it only asks three questions — what time zone you're in, the company name and the system administrator's password — before it automatically creates a flat view of the network," he said.

"Novell is trying to make NetWare 4 more usable so it's not perceived as a system for the Fortune 1,000," said Lee Doyle, direct of local net research at International Data Corp., a research firm in Framingham, Mass. "This release will have a broader appeal to environments with between 100 and 150 users. While 4.02 is a sign that NetWare is maturing, it won't really get out of its adolescence until 4.1 is released later this year."

NetWare 4.02 is available now. Current NetWare 4 users who have registered their operating systems with Novell will automatically receive a free upgrade to 4.02. Pricing for new users is unchanged from NetWare 4.01 (see graphic, this page).

©Novell: (801) 429-7000.

Comet's impact felt on Internet

BY ADAM GAFFIN

As the Shoemaker-Levy 9 comet crashed into Jupiter last week, amateur stargazers pounded the Internet, downloading images of the astronomical fireworks.

Servers at several astronomical observatories and control centers overloaded under the impact of hundreds of thousands of requests coming in via anonymous ftp, gopher and the World-Wide Web (WWW). The centers raced to add mirror sites with duplicate copies of the images.

The popularity of the event, in fact, raises the question of how to keep the Internet from choking corporate networks — especially with the proliferation of tools, such as Mosaic, which let users easily grab potentially huge files with a single mouse click.

Some Internet users, frustrated at being unable to get into the more popular image libraries early in the week, quickly grabbed

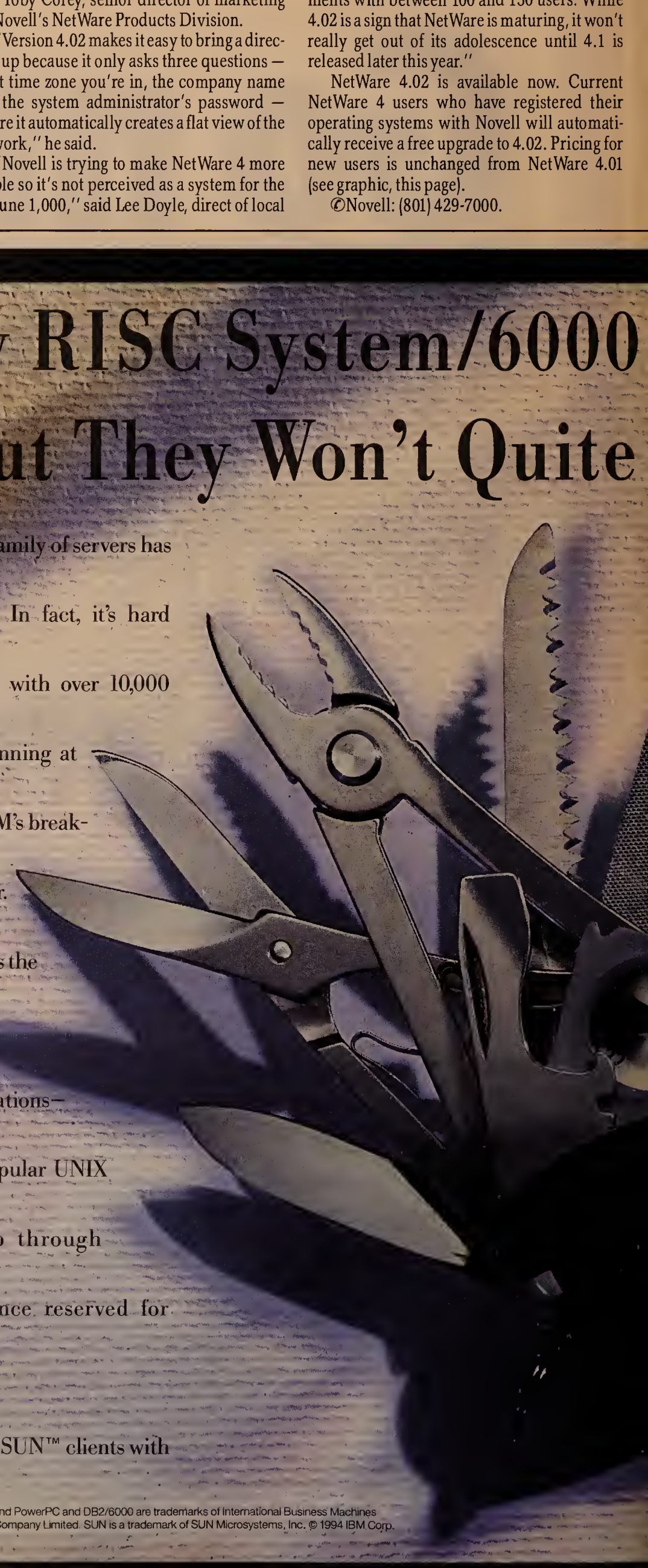
See **Comet,** *page 65*

The New RISC System/6000 But They Won't Quite

IBM's new UNIX®-based family of servers has a fascinating range of uses. In fact, it's hard to find a task they can't do, with over 10,000 available applications. All running at blinding speed, thanks to IBM's breakthrough PowerPC™ processor.

The RISC System/6000® is the perfect choice for downsizing mission-critical applications— using DB2/6000™ or any popular UNIX database. And you'll clip through number-crunching jobs once reserved for supercomputers.

You'll also be able to serve SUN™ clients with



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MESSAGE-ORIENTED MIDDLEWARE

IBM, others join to promote key client/server technology

BY ADAM GAFFIN

Foster City, Calif.

Six message-oriented middleware vendors last week formally banded together to promote their wares, which are designed to provide connectivity between client/server application components.

The Message Oriented Middleware Association (MOMA) hopes to increase the visibility of its members' products largely by helping to develop ways to get them to interoperate across a heterogeneous net. MOMA has no schedule yet for delivering interoperability definitions, however.

Charter members include large vendors, such as IBM and Digital Equipment Corp., and small ones, such as Momentum Software Corp. (see graphic).

The group also plans to solicit members from the user community, said Michael Millikin, MOMA chairman and chief technology officer at Ziff-Davis Exposition and Conference Co. here.

Millikin pointed to the Object Management Group as an industry consortium MOMA hopes to emulate.

Message-oriented middleware is designed to connect client-based applications with back-end databases and servers through asynchronous communications. The technology provides great flexibility, letting end users make one or more requests for data and then go onto other tasks while the back-end application gathers the information.

Interoperability, perhaps through a common application program interface (API), is key to promoting the relatively obscure technology, said Wayne Eckerson, senior editor for the *Open Information Systems* newsletter and a senior consultant at the Patricia Seybold Group consulting firm in Boston. As a senior editor at *Network World*, Eckerson made the initial push to form MOMA in the spring of 1993.

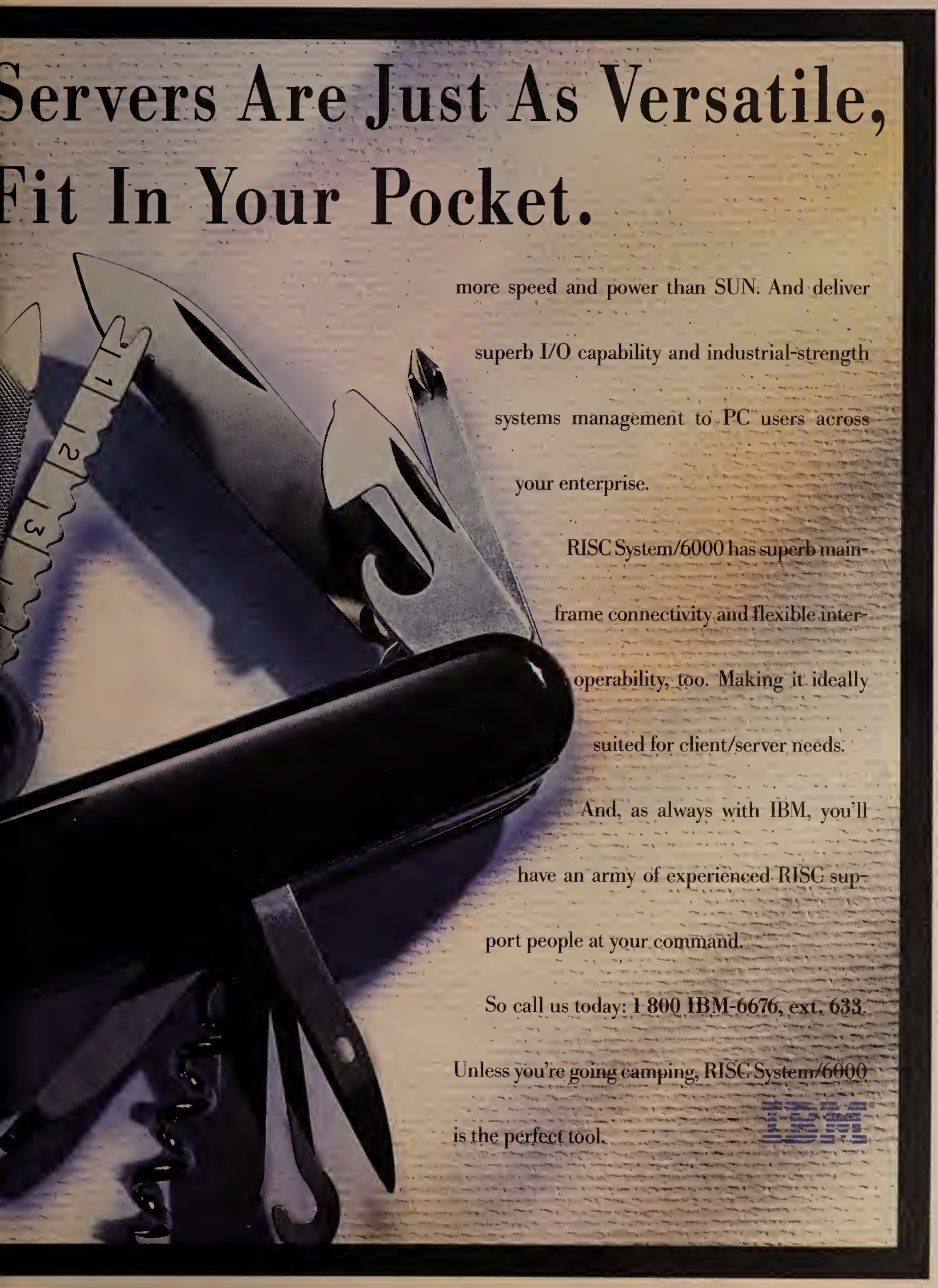
MOMA's founders

- Covia Technologies, Inc.
- Digital
- IBM
- Momentum Software Corp.
- PeerLogic, Inc.
- Apertus/System Strategies

Eckerson added that development of a visual application builder would help as corporate MIS moves away from API calls and similar techniques toward graphical fourth-generation language tools.

The vendors will also have to work hard to differentiate their products from other technologies used to create client/server applications, such as object request brokers, remote procedure calls and transaction monitors, Eckerson said.

✆MOMA: (415) 378-6699.



INTERNET *tip*

BY ADAM GAFFIN

One in a series of occasional tips on Internet-based information services.

Lotus Notes

Gill and Piette/Capital Systems of McLean, Va., runs an archive of information related to Lotus Development Corp.'s Notes groupware application. The archive consists of postings from:

- ✔ **The comp.sys.lotus-notes.-misc Usenet newsgroup**
- ✔ **The lnotes-l mailing list**

To access:
Send E-mail to notearch@gp.com. Leave the subject line blank. As the first line of your message, write the word "reply," followed by your E-mail address. On the next line, write the word "key," followed by the word you are searching for. To get a listing of available subjects, add a line that says "index." The system will reply via E-mail with a "shar" file that can then be unbundled on a Unix system into E-mail-type messages.

Gaffin can be reached via the Internet at agaffin@world.std.com.

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NETWORK WORLD
The Newsweekly of Enterprise Network Computing

Mailing Address: (If different from company address)

Address1 _____
Address2 _____
City _____ State_____ ZIP_____

1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Healthcare Services
05. ☐ Hospitality/Entertainment/ Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry)
12. ☐ Government Federal/State/Local
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/ Communications)
18. ☐ Systems/Network Integraters (VAR/VAD/ VAN/Systems/Software Houses)
19. ☐ Distributors Communications/ Computers
20. ☐ Other_____

2 What is your Job Function? (check one only)

NETWORK IS Management:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS,IT,MIS,Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management(CIO,CEO,PRES,VP, DIR,MGR,Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other_____

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 59 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise
3. ☐ Departmental
4. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services.

A	B	LOCAL AREA NETWORKS
☐ 01.	☐	Local Area Networks
☐ 02.	☐	Network Operating Systems Software (NOS)
☐ 03.	☐	LAN Storage Devices (optical, tape, disk, etc.)
☐ 04.	☐	LAN Backup Systems (optical, tape, disk, etc.)
☐ 05.	☐	Network Test Equipment/Diagnostic/ Management Software
☐ 06.	☐	Hubs/Intelligent Hubs
☐ 07.	☐	Cables, Connectors, Baluns
☐ 08.	☐	UPS
☐ 09.	☐	Network Adapter Boards/Network Interface Cards
☐ 10.	☐	Peer-to-Peer LANs
☐ 11.	☐	Wireless Networks
☐ 12.	☐	SNMP Network Management
☐ 13.	☐	ATM Switches
☐ 14.	☐	Remote LAN Access
☐ 15.	☐	Ethernet Switches
☐ 16.	☐	LAN Servers
☐ 17.	☐	Superservers
☐ 18.	☐	Remote Access/Communications Servers

A	B	REMOTE/WIRELESS COMPUTING
☐ 19.	☐	Laptops
☐ 20.	☐	Notebooks
☐ 21	☐	PDAs
☐ 22.	☐	PCMCIA
☐ 23.	☐	Mobile Data Services
☐ 24	☐	Wireless Data Services
☐ 25.	☐	Wireless Data Equipment

A	B	INTERNETWORKING
☐ 26.	☐	Bridges
☐ 27.	☐	Routers
☐ 28.	☐	Gateways
☐ 29	☐	Bridge/Routers

A	B	COMPUTERS/PERIPHERALS
☐ 30.	☐	Micros/PCs
☐ 31	☐	Minis
☐ 32.	☐	Mainframes
☐ 33.	☐	Workstations
☐ 34.	☐	Front-End Processors
☐ 35.	☐	Terminals
☐ 36.	☐	Printers
☐ 37.	☐	Cluster Controllers
☐ 38.	☐	Fax Machines
☐ 39	☐	Monitors

A	B	SOFTWARE/APPLICATIONS
☐ 40.	☐	Network Management
☐ 41.	☐	Systems Management
☐ 42	☐	Micro to Mainframe
☐ 43.	☐	Security
☐ 44.	☐	Communication/Terminal Emulation
☐ 45.	☐	Word Processing
☐ 46.	☐	Operating Systems
☐ 47	☐	Client Server Applications Development

A	B	SOFTWARE/APPLICATIONS (cont'd)
☐ 48.	☐	Applications Development
☐ 49.	☐	Data Base Management/RDBMS
☐ 50.	☐	Spreadsheet
☐ 51.	☐	Groupware
☐ 52.	☐	EDI
☐ 53.	☐	E-Mail
☐ 54.	☐	Windows/Graphical User Interface
☐ 55.	☐	4GL Development/Case
☐ 56.	☐	Multimedia
☐ 57.	☐	Graphics/DTP
☐ 58.	☐	Remote Access
☐ 59.	☐	Imaging
☐ 60.	☐	Suites
☐ 61.	☐	Middleware
☐ 62.	☐	Document Management

A	B	WIDE AREA NETWORKS EQUIPMENT & SERVICES
☐ 63.	☐	Modems (9.6K bps and over)
☐ 64.	☐	Modems (under 9.6K bps)
☐ 65.	☐	T-1/T-3 Multiplexers
☐ 66.	☐	T-1/T-3 Services
☐ 67.	☐	Inverse Multiplexers
☐ 68.	☐	Fractional T-1
☐ 69.	☐	SMDS
☐ 70.	☐	ATM (Asynchronous Transfer Mode)
☐ 71.	☐	Matrix Switches
☐ 72.	☐	Packet Switches
☐ 73.	☐	Protocol Converters
☐ 74.	☐	Diagnostic/Test Equipment
☐ 75.	☐	DSU/CSU
☐ 76.	☐	Microwave
☐ 77.	☐	Fax Boards/Modems
☐ 78.	☐	VSAT
☐ 79.	☐	Fiber Optic
☐ 80.	☐	Satellite
☐ 81.	☐	ISDN
☐ 82.	☐	PBXs (over 1000 lines)
☐ 83.	☐	PBXs (under 1000 lines)
☐ 84.	☐	Automatic Call Distributors
☐ 85.	☐	Voice Messaging Systems
☐ 86.	☐	Videoconferencing/Teleconferencing
☐ 87.	☐	Voice Response/Processing
☐ 88.	☐	Dedicated Leased Line
☐ 89.	☐	Switched Data
☐ 90.	☐	E-Mail/Online Services
☐ 91.	☐	Image Processing
☐ 92.	☐	800/900 Services
☐ 93.	☐	WATS/MTS
☐ 94.	☐	International
☐ 95.	☐	Virtual Networks
☐ 96.	☐	Frame Relay
☐ 97.	☐	Value Added Services
☐ 98.	☐	CIT (Computer-Integrated Telephony)

☐ 99. ☐ None of the above (1-98)

6 What is the total number of LANS, Workstations/Nodes: At this Location/ In your Organization?

	At This Location: LANs		Workstations/ Nodes	Entire Organization: LANs		Workstations/ Nodes
1.	☐	5000+	☐	☐	5000+	☐
2.	☐	1,000 - 4,999	☐	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐	☐	100 - 999	☐
4.	☐	50 - 99	☐	☐	50 - 99	☐
5.	☐	10 - 49	☐	☐	10 - 49	☐
6.	☐	9 or less	☐	☐	9 or less	☐
7.	☐	None of the above	☐	☐	None of the above	☐

7 Which of the following network platforms are currently installed/planned? (check all that apply)

Installed A	Planned B	NETWORK ARCHITECTURES
☐ 01.	☐	SNA
☐ 02.	☐	DECNET
☐ 03.	☐	MAP/TOP
☐ 04.	☐	TCP/IP
☐ 05.	☐	DCA (Unisys)
☐ 06.	☐	X.25
☐ 07.	☐	Novell IPX/SPX
☐ 08.	☐	APPC/APPN/LU6.2
☐ 09.	☐	NETBIOS
☐ 10.	☐	OSI
☐ 11.	☐	APPLETALK
☐ 12.	☐	NSF
☐ 13.	☐	XNS
☐ 14.	☐	OTHER_____

		NETWORK OPERATING SYSTEM
☐ 15.	☐	LOCALTALK (APPLETALK)
☐ 16	☐	BANYAN (VINES)
☐ 17.	☐	DCA (IRMALAN)
☐ 18.	☐	DCA (10-NET)
☐ 19.	☐	IBM (LAN SERVER)
☐ 20.	☐	IBM (PC LAN PROGRAM)
☐ 21.	☐	MICROSOFT (LAN MANAGER)
☐ 22.	☐	NOVELL (NETWARE, 2X, 3X, 4X)
☐ 23.	☐	PROTEON (PRONET)
☐ 24.	☐	3COM (3+, 3+OPEN)
☐ 25.	☐	ARTISOFT (LANTASTIC)
☐ 26.	☐	HAYES (LANSTEP)
☐ 27.	☐	DEC (PATHWORKS)
☐ 28.	☐	WINDOWS NT/ADVANCED SERVER
☐ 29.	☐	OTHER_____

Installed A	Planned B	LAN ENVIRONMENT
☐ 30.	☐	4M TOKEN RING
☐ 31.	☐	16M TOKEN RING
☐ 32.	☐	ARCNET
☐ 33.	☐	ETHERNET
☐ 34.	☐	100 M ETHERNET
☐ 35.	☐	STARLAN
☐ 36.	☐	FDDI
☐ 37.	☐	LOCAL TALK
☐ 38.	☐	10BASE-T
☐ 39.	☐	ATM
☐ 40.	☐	OTHER_____

		COMPUTER OPERATING SYSTEM
☐ 41.	☐	DOS
☐ 42.	☐	UNIX/XENIX/AIX
☐ 43.	☐	OS/2
☐ 44.	☐	OS/2.X
☐ 45.	☐	IBM MVS
☐ 46.	☐	IBM VM
☐ 47.	☐	DIGITAL VMS
☐ 48.	☐	MACINTOSH
☐ 49.	☐	WINDOWS
☐ 50.	☐	WINDOWS NT
☐ 51.	☐	X WINDOWS
☐ 52.	☐	SOLARIS
☐ 53.	☐	OTHER_____

☐ 54. ☐ NONE OF THE ABOVE (1-53)

8 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

9 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes Installed	Mainframes Planned	Minis Installed	Minis Planned		Mainframes Installed	Mainframes Planned	Minis Installed	Minis Planned
01. IBM	☐	☐	☐	☐	06. DATA GENERAL	☐	☐	☐	☐
02. DIGITAL	☐	☐	☐	☐	07. HP	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐	08. TANDEM	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐	09. UNISYS	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐	10. OTHER_____	☐	☐	☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At This Location Servers	At This Location Clients/Nodes	Entire Organization Servers	Entire Organization Clients/Nodes
11. POWER MACINTOSH				
12. MACINTOSH OTHER				
13. POWER PC BASED				
14. PENTIUM BASED				
15. 80486 BASED				
16. 80386 BASED				
17. 80286 BASED				
18. 80806/80808 BASED				
19. ALPHA BASED				
20. RISC/UNIX BASED WORKSTATIONS				
21. OTHER				

10 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million and over
02. ☐ $50 - $99.9 million
03. ☐ $25 - $49.9 million
04. ☐ $20 - $24.9 million
05. ☐ $10 - $19.9 million
06. ☐ $5 - $9.9 million
07. ☐ $1 - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $499,999 or less
10. ☐ NONE OF THE ABOVE

11 Estimated gross annual revenues of your entire company/institution: (check one only)

1 ☐ Over $10 billion
2. ☐ $1 to $9.9 billion
3. ☐ $500 to $99.9 million
4. ☐ $100 to $499.9 million
5. ☐ $50 to $99.9 million
6. ☐ $10 to $49.9 million
7. ☐ $5 to $9.9 million
8. ☐ $4.9 million or less
9 ☐ NONE OF THE ABOVE

12 Estimated number of employees for your entire corporation: (check one only)

1 ☐ Over 10,000
2 ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5 ☐ 500 - 999
6. ☐ 499 or less

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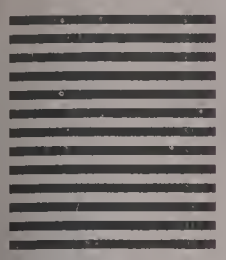

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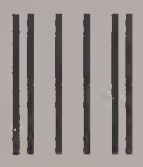

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VIDEOCONFERENCING

PictureTel sounds off with audio

BY ELLEN MESSMER

Danvers, Mass.

PictureTel Corp. is boosting sound quality in its System 1000 and System 4000 videoconferencing equipment with a microphone designed to shut out background noise and maintain a steady sound level.

NGUYEN

The PowerMic, a saucer-shaped tabletop microphone that can provide a constant volume level for videoconference participants even as they move about a room, is the first microphone built specifically to handle common group conference sound problems, analysts said.

"A lot of attention has been paid to the video side of videoconferencing but not the audio side," said Walter Miao, vice president of technology at consultancy Link Resources Corp. in New York. "PictureTel is the first to do this."

Khoa Nguyen, senior vice president and general manager of PictureTel's group conferencing systems division, said the PowerMic is intended to eliminate typical problems such as the sound fading that occurs as participants move about the room and the rustle of slides used with an overhead projector.

The PowerMic — actually four small microphones pointed at 90-degree angles in different directions — connects to the PictureTel System 1000 and System 4000 coder/decoders, which have digital signal processors that filter out background noise and steady the sound level in a room. Andy Nilssen, PictureTel's director of product marketing, said the PowerMic can diminish noise by a factor of four.

Miao said it is surprising that PictureTel is not integrating sound control into all of its video systems, but PictureTel said that with its $5,000

See **Audio**, *page 21*

IBM closes gap between APPN, 3270

BY MICHAEL COONEY

Raleigh, N.C.

IBM has closed a once-glaring hole in its peer-to-peer networking strategy.

Follow UP

The recent announcements of APPC3270 (A3270) and dependent Logical Unit Requestor (dLUR) give Systems Network Architecture 3270 users a new lease on life as IBM pushes its customer base to its Advanced Peer-to-Peer Networking technology.

"We know 3270 applications will be around for years, but we also want to enable the development of client/server, APPN-based applications without affecting current host-based applications," said Steve Joyce, director of IBM's APPC Enablement Group here. "We are now providing a choice for how 3270 users can become part of an APPN network."

For users who are just beginning to employ APPN or need only occasional 3270 access to a host from an APPN network, IBM is offering A3270 (*NW*, July 18, page 8).

A3270 is a protocol that will let 3270 traffic ride on top of LU 6.2, the peer-to-peer datastream found in APPN-based nets. IBM will include A3270 in future revisions of its main operating systems — OS/2, OS/400, VM and MVS.

"A3270 is for basic, casual terminal connectivity with a host," Joyce said. "It works with older VTAM levels and provides improved — but limited — connectivity to the network."

For example, 3270 users in remote workgroups could communicate with each other without first having to set up a 3270 session with the mainframe.

But A3270 supports only 3270/LU 2 functions, not other LU types such as LU 3, which is for printing functions. It also does not support LU 0, the communication datastream used in most banking applications and other "roll your own" applications.

"[A3270] sounds like it could reduce the amount of

See **IBM**, *page 21*

Sterling enhances its NetWare mgmt. wares

Lets users control distributed NetWare LANs.

BY MICHAEL COONEY

Reston, Va.

Sterling Software, Inc. this week will announce a new version of its mainframe-based NetWare management tool that adds new systems management functions and lets users not only monitor, but also control, distributed NetWare LANs.

Like the previous version, Solve:Connect for NetWare Version 1.1 will let users gather Novell, Inc. NetWare local network alerts and status information, but it adds the ability to manage file, disk and directory resources, all from a mainframe-based IBM NetView or Sterling Net/Master management platform. The new version also lets users send commands to NetWare servers to correct problems.

"Data center managers are becoming increasingly responsible for control over the LANs in their enterprise, and Solve:Connect will help them fix problems and maintain the LAN from the same platform they control their SNA networks," said Tom George, product manager for Sterling's net management products.

Solve:Connect for NetWare consists of two parts: mainframe software that runs as a VTAM application on a Systems Network Architecture host and a NetWare Loadable Module (NLM), which runs on a NetWare Server. VTAM controls the communication flow through SNA hosts.

Reality Check

Product: Solve:Connect for NetWare Version 1.1
Company: Sterling Software

The benefits:
- Centralized management of distributed NetWare LANs.
- New systems management functions.
- Support for IBM RUN command to correct problems on remote LANs.

The drawbacks:
- NetView or Net/Master operator has to tailor RUN commands.
- Product has to keep up with IBM changes to VTAM.

The user view:
"It's a simple way to take care of managing LANs from a central point. That's important because gaining centralized control of distributed LANs early in their development will save a lot of money in the future."

Roland Gonzales, senior systems communications programmer, First Colony Life Insurance

In its original incarnation, Version 1.0, Solve:Connect supported a NetWare Management Agent that provided only rudimentary management of the NetWare environment. For example, Net/Master could monitor NetWare servers, but it could not issue commands down to servers to fix problems.

Version 1.1 addresses that shortcoming with support for the RUN command, an IBM facility that can be tailored to support any type of management command.

NetWare error data is translated by the NLM on the server into the Network Management Vector Transport (NMVT) format, the SNA message type used to carry network management data, then shipped to the host. RUN commands, which must be tailored by users to their own specifications, are then employed to send commands back to the server.

For example, the NLM can signal Solve:Connect

See **Sterling**, *page 21*

BRIEFS

MultiTech Systems, Inc. last week rolled out a new high-speed rack-mountable and a low-speed internal modem. The MT2834BR is a 28.8K bit/sec **V.34-compliant modem** for the firm's CC-Series 19-inch rack-mountable modem system. The modem provides V.42 error correction and V.42bis data compression-yielding asynchronous throughput of up to 115K bit/sec.

The MT1932ZPX is an **internal data/fax modem** capable of supporting data speeds up to 19.2K bit/sec and 14.4K bit/sec Group III fax transmissions. Designed for 8- and 16-bit industry-standard personal computers, the modem comes with MultiExpress data and MultiExpressFax Windows-based communications software. The MT2834BR will be available this week at a price of $740. The MT1932ZPX is available now for $269.

MultiTech Systems: (800) 328-9717.

CR Systems Corp. last week added X.25 Qualified Logical Link Control (QLLC) support to its line of **CommServer gateways.** The new feature converts **QLLC** traffic to Logical Link Control 2 packets and sends the data via a Token-Ring connection to a front-end processor (FEP). This frees the FEP from receiving X.25 traffic directly and eliminates the need for NCP Packet Switch Interface (NPSI) on the FEP. NPSI is an IBM product that lets FEPs receive X.25 traffic. The new feature is available starting at $2,995.

CR Systems: (404) 767-8230.

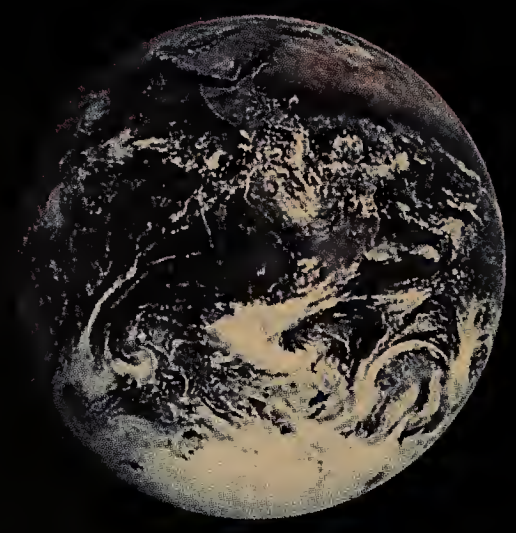
Cylink Corp., the Sunnyvale, Calif.-based maker of encryption products, last week unveiled the **CIDEC-MLS Network Security System,** a rack-mountable system that can handle up to 12 encryption plug-in cards for dial-in access between 300 and 768K bit/sec.

Cylink: (408) 735-5800.

Engage Communication last week enhanced its **ExpressRouter** line of Ethernet wide-area networking routers by adding support for frame relay and the Point-to-Point Protocol routing protocol, as well as support for Transmission Control Protocol/Internet Protocol and AppleTalk local net protocols.

ExpressRouter models are available with one to three WAN serial ports that support line rates up to T-1. The frame relay interface supports speeds up to 56K bit/sec. An ExpressRouter with one local and one WAN port costs $1,795. Additional WAN ports cost $500. WAN interface cards for 56K bit/sec frame relay, Dedicated Digital Service and Integrated Services Digital Network cost from $500 to $800.

Engage: (408) 688-1021.



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AT&T

by Scott Bradner

Future structures on the Internet

Just to prove that the press can do the reader's bidding, at least every now and then, this column is in response to a reader's request for an update on the status of the "new NSFNET" in the U.S.

Internet connectivity within the U.S. is currently provided by approximately two dozen larger providers and a fast-growing number of smaller ones. A number of the larger ones started life with the support of the National Science Foundation to provide Internet service to the Research and Education (R&E) community and are commonly known as regional networks. The rest of the large providers are commercial entities and have never had an R&E focus.

The regional networks currently use the NSF-provided NSF Network for their internetwork connections, where the users of those connections agree to restrict their usage of the NSFNET to R&E traffic or traffic in support of R&E activities.

The commercial networks and those regionals that have expanded beyond their R&E base use the Commercial Internet Exchange (CIX) and MAE-east as interconnect points. The CIX is a multiport router located in the San Francisco Bay area. MAE-east was designed as a prototype traffic exchange point for future network architectures and is a metropolitan-area Ethernet in the Washington, D.C. area.

The NSF has been trying to get out of the general R&E backbone business for quite a while and now seems to mean it. It is turning off the NSFNET service. The NSF is contracting for a new network service, the Very High Speed Backbone Network Service (vBNS). But since the usage of that will be very restricted, the vBNS will play no substantial role in the Internet of tomorrow.

The NSF has proposed establishing a number of traffic exchange points nationwide, called Network Ac-cess Points (NAP), to connect the regional nets. The NSF has designated four NAPs, near Chicago, New York, San Francisco and Washington, D.C.

The regional networks can make their own connections to a NAP or contract for one from some other network service provider.

Of course, in order to ensure full connectivity, they would need to attach to all the NAPs or purchase service from a provider that did. As far as I know, all of the regionals with the exception of one have chosen to purchase service from network service providers.

Since the NSF was providing the connection to the NSFNET at no cost to the regionals and no one has found any provider willing to do the same, the regionals will suddenly be faced with costs that they previously did not have. In order to ease the transition, the NSF is offering to help fund each regional's connection to a network service provider, but only to the extent that it is used for R&E traffic and at a decreasing percentage of that until the support vanishes after four years.

There is one additional part of the NSF plan. Since figuring out how to get all that data from here to there will become more difficult as the Internet increases in complexity, it will be far better to have a single organization responsible for providing routing information at the NAPs, the DMZs of the new Internet. The NSF is designating a Routing Authority to assume this role, as well as to develop and introduce new routing technology to meet the increasing complexity of the Internet.

The process of migrating to the new structure is under way. The NSF is due to make awards to the regional networks very soon. You can expect to see a number of announcements in the next few weeks about who is buying what from whom.

There are some unknowns at this point. The most troubling is how strong the interconnections between the commercial nets, the international links and the NAP-based part of the Internet will be.

Disclaimer: Harvard neither owns nor operates a regional network and has no opinions in this area.

➡ Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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Car auctions via Business TV to debut

Aucnet USA plans to sell 1,500 cars per day via satellite-based service.

BY ELLEN MESSMER

Atlanta

The used-car business is entering the information age with a new satellite-based service that will let car dealers at computers view photos of vehicles for sale and bid on them via an on-line auction.

In a unique application of Business TV, Aucnet USA, Inc. this fall will broadcast images of cars up for sale, along with related data, to dealers equipped with satellite dishes and computers. Aucnet USA's imaginative use of technology could quickly make it a major player in the U.S. used-car market, where more than 14 million cars are sold every year.

DENNIS

"We hope to sell 1,500 cars per day," said Dick Dennis, Aucnet USA's vice president of marketing. In Japan, Aucnet, Inc.'s satellite-based service made it the leading auction house, with a 10% share of the Japanese used-car market.

The Aucnet on-line auction saves buyers from spending days at a time traveling to auctions and sellers from having to transport cars to be sold. "Under our system, the car doesn't have to be transported until it's sold," Dennis said.

Each car going in the satellite auction will be examined by an Aucnet inspector who will grade its general condition. The inspectors will enter data about the car on Toshiba Corp. T200 CS pen-based computers and take digital photos of the vehicle, to be stored on an IBM Application System/400.

A week before the auction, Aucnet will distribute facsimiles to each participating dealership via satellite to let managers know which cars will be up for bid.

On "preview day," images of each car with associated data will be broadcast to dealers via Hughes Communications, Inc. Ku-band one-way Business TV service.

Convergent Media Systems, Aucnet's integrator, is now installing at dealerships the Prodelin Corp. 1.8-meter antennae that will receive the broadcast signal. Coaxial cable will link the antenna to the Aucnet desktop personal computer outfitted with the firm's proprietary software and receiver.

When auction day arrives, potentially thousands of dealers at Aucnet computers will be able to dial into the company over dedicated land lines into the firm's X.25 packet access device to connect to the AS/400 host.

The Aucnet auction manager, appearing live on computer, will start each auction. While viewing the image and data related to a car up for sale on screen, dealers can bid for it in $50 increments by pushing the computer's bid stick, basically a computer joystick. Subscribing dealerships are given preapproved credit lines. The highest bid is displayed on screen to all on-line bidders. "The price changes in all systems in less than a tenth of a second," Dennis noted.

Dealers have a six-second interval to consider whether to top the highest bid. After that, the sold sign comes on everyone's screen informing the auction participants of the highest bidder's identity. The winner must press the confirmation button, which starts the document processing, Dennis said.

There are well over 20,000 new and used-car dealerships in the U.S. — all potential Aucnet customers. While Dennis declined to name companies that will participate in the first U.S. satellite-based auction this fall, he hinted that Aucnet has a number of new car dealerships signed up, and a few national rental car companies will try it to sell their cars.

ENCRYPTION KEYS

NIST acknowledges patent infringement

BY ELLEN MESSMER

Washington, D.C.

The U.S. government has acknowledged that technology for encryption keys, which the National Security Agency uses in the Clipper Chip and Capstone chipsets, infringes on existing patents.

The National Institute of Standards and Technology (NIST) has agreed to pay inventor Silvio Micali, professor at Massachusetts Institute of Technology, an undisclosed amount of money to license his key-escrow patents so the government can buy equipment using the Clipper Chip and Capstone chipsets without fear of lawsuits.

However, Tom Hemnes, Micali's attorney at Foley, Hoag & Eliot in Boston, said private-sector companies wanting to buy or sell equipment based on his key-escrow system will have to negotiate separate licenses.

Under the escrow scheme backed by the White House, the federal government will hold a duplicate key for every Clipper Chip- or Capstone-enabled device. The duplicate key will be split in two and held by two federal agencies, NIST and the Department of the Treasury. The key's halves, when recombined, will let officials unlock a user's scrambled voice and data communications.

The government expects to buy more than 2 million Capstone PCMCIA cards for the upcoming Defense Message System and wants vendors to implement Capstone in products for the private sector, as well. Clipper Chip is used in AT&T's Secure Telephone Device, which AT&T said has been purchased by the Federal Bureau of Investigation and some businesses.

The terms of the agreement between Micali and NIST are being kept under wraps until the government finalizes the procurement action, a NIST spokeswoman said.

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IBM

Continued from page 13

LU definitions we would have to have on the mainframe and front-end processor, which would be a big help," said Kyle Cooper, a telecommunications specialist with The American Cancer Society in Austin, Texas. "It would give the end user a little more flexibility in communicating with other users."

For users needing full-blown 3270 access to APPN nets, IBM is now offering dLUR, which is client software that lets traditional SNA users migrate 3270 traffic to APPN nets. It will ultimately reside on a variety of traditional IBM and non-IBM equipment.

However, it is available now only on the 3174 controller, which began shipping with dLUR support in June.

With dLUR, 3270 data can travel on an LU 6.2 session over an APPN network to an SNA mainframe, where the VTAM-based server software, dependent LU Server (dLUS), directs the traffic to its destination. Together, the components will enable 3270 users to freely access multiple APPN network hosts and resources.

Two solutions to the same problem

IBM now offers two ways to bring 3270 traffic into the peer-to-peer world.

APPC3270	dLUR
■ Uses LU 6.2 as transport between 2 devices for 3270 data.	■ Uses 6.2 as transport for 3270 traffic in APPN nets.
■ Supports LU 2 only.	■ Supports LU 0, 1, 2 and 3.
■ Will run with older version of VTAM (3.3 and below).	■ Requires most recent version of VTAM (4.2).
■ Will not support printers.	■ Retains full net management support.
■ Has no net management support.	

GRAPHIC BY SUSAN J. CHAMPENY

The dLUR technology differs from A3270 in that it supports all IBM LU types, although it requires the latest release of VTAM. It is also scalable to large environments.

"With dLUR, 3270 users have much more flexible connectivity options to resources in the network, plus they can utilize APPN's routing functions," Joyce said.

APPN SUCCESS

Support of dLUR is also considered crucial to the ultimate success of APPN.

"Being able to support 3270 devices fully in an APPN network is the single most important checklist item SNA users have been waiting for to plan their migration to APPN," said Robin Layland, a principal consultant with Layland Consulting in West Hartford, Conn.

According to Anura Guruge, an independent analyst based in New Ipswich, N.H., the most important step for dLUR will be getting third-party vendors to implement it in their products.

"There's a lot of non-IBM equipment out there that will need to support dLUR if it is to be successful."

The dLUR technology took a step in that direction recently by reaching closed pages status within the APPN Implementors Workshop.

✆IBM: (914) 642-6238.

Audio

Continued from page 13

price tag, sound control costs enough to be considered an option.

PictureTel is also beefing up the audio capabilities of its M-8000 Multipoint Bridge, enabling it to support automatic noise suppression and sound-level control. With the upgrade, the M-8000 would be able to negotiate sound control for as many as 16 sites.

The M-8000 will also be able to deliver a soft "bong tone," signaling that a scheduled videoconference is about to begin, or that different remote sites are joining or leaving the videoconference.

At the same time, PictureTel is also adding support for its wideband 7-KHz audio system to the bridge. The M-8000 already supports 3-KHz narrowband audio on both a proprietary basis and according to the standard set by the International Telecommunication Union.

"The 3-KHz narrowband sounds like a telephone call, while 7-KHz is more like FM radio," said David Yuell, PictureTel's vice president of marketing. Wideband not only sounds better, he said, but includes a channel for datastreams, such as graphics.

PowerMic ships as part of a $5,000 option package with automatic noise suppression and automatic gain control for the System 1000 and System 4000. The PowerMic and audio upgrades for the M-8000, not yet priced, will ship in August.

✆PictureTel: (508) 762-5000.

Sterling

Continued from page 13

on the mainframe that a server is running low on hard-drive space, which could slow the LAN's performance. Solve:Connect can then allocate unused disk space to the server, if available, or call for service to add more space.

According to analysts, the new version of Solve:Connect for NetWare is part of Sterling's strategy to regain user market and mind-share lost in the past few years. The company's indecision about product directions after it acquired Systems Center, Inc. last year left its network management products on the back burner and gave competing products, such as IBM's NetView family, a big edge in the marketplace.

Sterling recently repackaged its Solve:NetMaster enterprise management platform and aimed it squarely at IBM NetView users, offering them as much as 30% off if they switch host-based management platforms (*NW*, June 6, page 5).

"The Solve suite of products provides a simplified view of an increasingly complex, heterogeneous environment," said Walt Dymek, an associate analyst with the DataPro Information Services Group in Delran, N.J.

Solve:Connect for NetWare will be available by the end of the month. The host component will cost $10,000. Server NLMs will be offered in packages of 20, 100 and 500 for $8,000, $35,000 and $150,000, respectively.

✆Sterling: (703) 264-8000.

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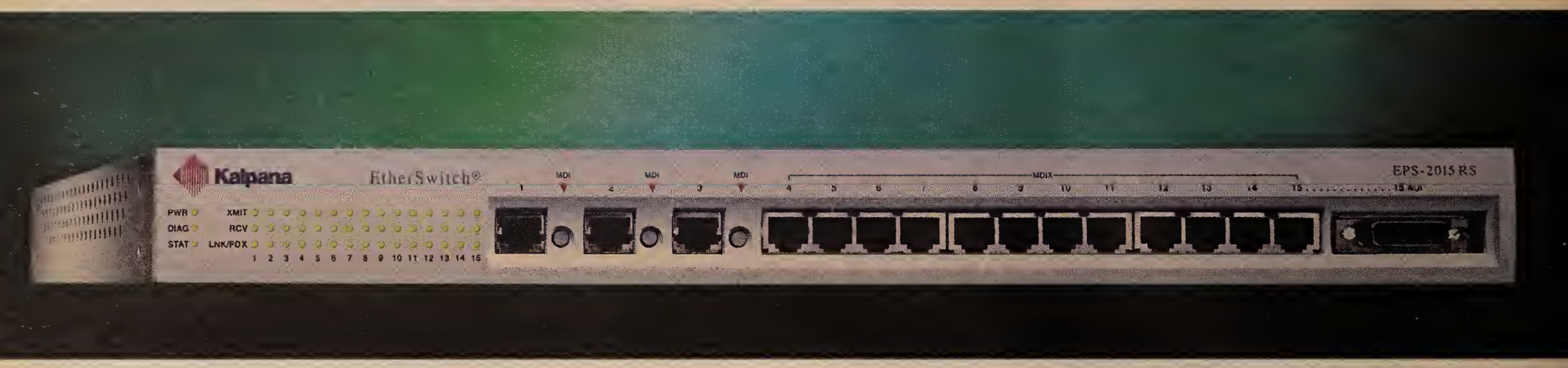
WHY IS EVERYBODY TALKING ABOUT 100MBPS BUT BUYING KALPANA ETHERSWITCHES?



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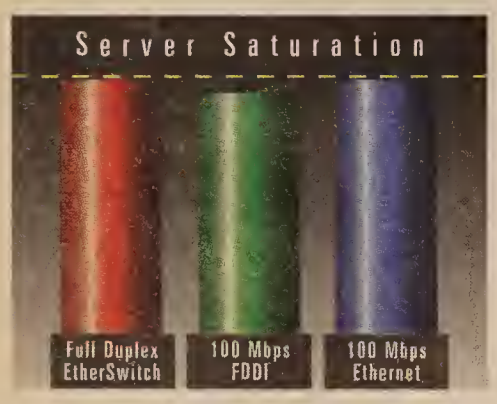

Running real applications, popular NetWare 486 servers top out at about 20Mbps, with EtherSwitch ahead of FDDI and neck-and-neck with 100Mbps Ethernet.

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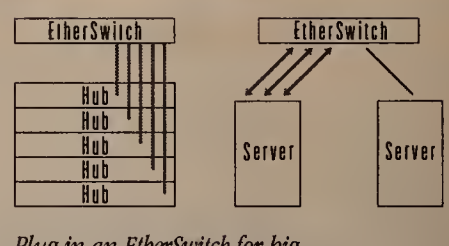
Our new Switch.NLM software balances the distribution of network traffic between two or more adapters in the same Novell server, boosting aggregate throughput to the server to more than 60 Mbps. Plus, if an adapter fails, Switch.NLM automatically reroutes traffic to the others.



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yes It runs with NetWare

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Circle Reader Service #**36**

LAN WORLD

A Special Monthly Section for Lan Decision Makers

INSIDE LANWORLD

- **Health care users** see a burgeoning need to bulk up their nets. Page L2.
- **The AppleTalk Control Protocol** is earning new respect as a way to pass AppleTalk across busy WANs. Page L4.
- **Desktop document imaging** systems help to do away with paper. Page L8.
- **Lack of network documentation** can be just as damaging as a crash. Page L11.
- **Products that empower** users vs. those for power users. Rich feature sets don't necessarily make products good. Page L13.
- **As departmental file servers evolve** into enterprise application servers, users put them back in glasshouses. Page L14.
- **Novell may offer** users a choice of direct or reseller support this fall. Page L18.

Denver International Airport network is ready for takeoff

BY PAUL DESMOND

Denver

While the new Denver International Airport (DIA) may not yet be open for business, the fiber-optic internetwork that will support the new facility is raring to go.

The city has constructed a massive SONET- and FDDI-based network utility that will be shared by the various airlines and other tenants of DIA. Besides employing some of the latest technological wizardry, the net is also part of a growing trend toward shared-tenant airport networks that save money and time for tenants and landlords alike.

Some 5,300 miles of fiber supports the SONET and FDDI nets at the new Denver International Airport.

Those involved with the DIA network say the concept can apply in other, more general business applications where there are multiple tenants sharing the same facilities, such as industrial parks, office parks and high-rise buildings.

The key to success, they said, is to establish a limited number of connectivity standards, then stick to them.

At DIA, those standards basically came down to Category 5 twisted-pair wiring and 10Base-T and token-ring local networks. If the airlines can deal with that, they will fit in just fine.

But getting to that point was no mean feat, according to Marshall Parsons, communications engineer for Greiner, Inc. Greiner is a design engineering company that was part of the management team hired to oversee construction of DIA's communications system. Parsons was design project manager for cabling systems, which included fiber, premises wiring and equipment.

"The devil's in the details. Airlines have some very specialized systems that have evolved over a long time, and they had to be accommodated," Parsons said. "You can't just categorize everything as voice or data. There were a billion flavors of each."

There were also some serious size considerations. DIA is huge — 53 square miles in all, more than half the size of Denver itself. The city claims Chicago's O'Hare Airport and the Dallas-Fort Worth International Airport could fit inside DIA with 4 square miles to spare.

The airport includes about 40 buildings, from main terminals and hangars to car rental buildings, office and storage facilities. Four-inch conduit runs to all of them carrying 5,300 miles of single-mode and multimode fiber-optic cable.

That cable supports two main networks — a Synchronous Optical Network that handles mainly voice and a Fiber Distributed Data Interface backbone that supports data.

The SONET net consists of six 155M

See **Airport**, *page L17*

BRIEFS

Chipcom Corp. last week announced record **revenue and earnings** for the second quarter of its 1994 fiscal year ended June 25. Revenue of $61.3 million was up 62% from $37.7 million in the same quarter last year. Net income for the quarter increased 154% to $6.1 million, compared to $2.4 million during the same period in 1993.

Chipcom: (508) 460-8900.

Xyplex, Inc. last week unveiled **financial results** of its second quarter ended June 30. Revenue of $23.8 million represents a 23% increase over the same quarter last year, but net income of $2.4 million in the quarter was a 3% decrease from the corresponding quarter in 1993.

Xyplex: (508) 952-4700.

At last week's meeting of the **Institute of Electrical and Electronics Engineers, Inc.,** the 802.3 working group agreed to send the 100Base-T **fast Ethernet draft standard** to its members for a letter ballot. The vote on the standard that defines running Ethernet networks at 100M bit/sec is the first of two formal reviews the specification must pass before gaining finalized status. The next step will be a sponsor ballot by the IEEE 802 LAN/MAN Standards Committee.

Optical Data Systems, Inc. (ODS) last week rolled out three new fiber-based token-ring hub products that can be used with its line of chassis-based **Infinity intelligent hubs.** The 1094-ATRF18J hub module is an 18-port token-ring interface module for the Infinity. The 18 ports can be switched on a per-port basis to any one of the four token-ring backplanes supported by Infinity. Available now, it costs $7,680.

The 836J-NC is a token-ring transceiver that supports fiber-optic connectors, and the 873J-OLI-ISA is an Industry Standard Architecture-based network interface card that can connect directly to the Infinity or any other 802.5J-compliant hub. Also available now, the transceiver and adapter card cost $550 and $1,630, respectively.

ODS: (214) 234-6400.

New Sniffer report generator capitalizes on available data

BY SKIP MACASKILL

Menlo Park, Calif.

Network General Corp. this week is expected to roll out a new report generation application that will make it easier for net managers to utilize data collected by the company's line of Sniffer network analysis products.

The Network General Reporter is the first in a series of applications the company will develop to help users tap into the extensive information that its Distributed Sniffer System (DSS) tools gather.

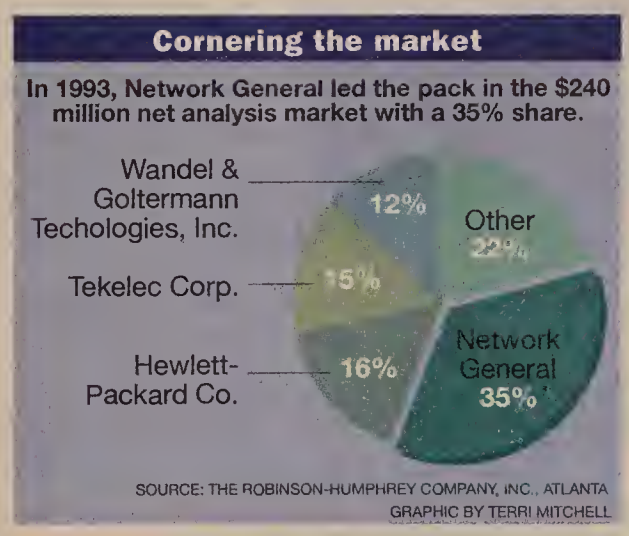
The new application will enable users to generate reports concerning a variety of Simple Network Management Protocol and Remote Monitoring variables, including network utilization, bad packet generation by particular end nodes and packet collisions on individual local net segments.

Reporter will give net managers access to a maximum of 20 automated reports that can be displayed in more than 80 different ways. The reports are created from data stored in DSS' SQL database, proving users with a historical view of the network that allows them to do trend analysis and capacity planning.

Reporter also uses DSS' Expert Analysis data to automatically generate summary reports of network activity and problems at all seven layers of the Open Systems Interconnection model.

The application improves on the previous method of report generation, which included outputting data in standard file formats that could then be exported to a spreadsheet application such as Microsoft Corp.'s Excel.

Reporter essentially automates that entire process — a capability that was greeted with open arms by the application's beta users.



According to Bob Seibenthaler, network manager at FileNet Corp. in Costa Mesa, Calif., Reporter enables him to provide better service and support to the company's customer base.

FileNet supports and manages hundreds of document imaging systems across the country via a series of DSS components it has installed at customer sites. The company uses DSS to monitor those systems and alert the customer if the networks need further segmentation due to imaging loads. Reporter is currently in beta test at two of those locations.

"Previously, we had to write Excel and Word macros to generate reports, and as our user base grew, that turned into a time-consuming process," Seibenthaler said. "With Reporter, we can generate standard reports, and we don't need an experienced technician to do it."

He estimated that the application reduces the time spent

See **Generator**, *page L6*

Health care users stress need to share information

Ability to exchange data leads network initiatives.

BY ROCHELLE BRODER

Health care users see the need to share data and applications across the enterprise as the driving force behind their efforts to bulk up their network infrastructures.

While a recent industry study has indicated that a move to managed health care is influencing net managers at medical facilities, users said the basic need to communicate with other departments and exchange information is uppermost in their minds.

"We've learned that a bunch of people working all by themselves are not as efficient as a bunch of people working all together," said Dan Kohner, manager of network services for the University of Texas Anderson Cancer Center in Houston.

"The technology has come so far that there's no such thing as not being networked, especially if a company wants to get much bigger than it is today," Kohner said.

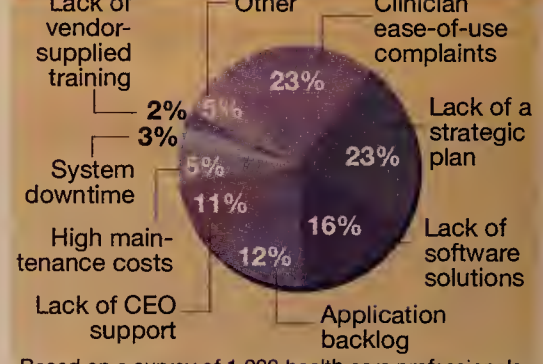
The Healthcare Information and Management Systems Society and Hewlett-Packard Co. conducted a survey earlier this year that polled 1,033 health care information professionals on the status of information technology and networking in their area.

The survey indicated communications professionals are dealing with a number of networking issues, including client/server migration, continuing reliance on Ethernet, apprehension about Asynchronous Transfer Mode technology and security woes associated with increasing Internet use.

According to the survey, ease-of-use complaints lead the list of the most frustrating information systems (IS) problems facing health care net managers today (see graphic).

Anticipated health care reforms — especially the move to managed care via a national health care initiative espoused by the Clinton administration — are pushing health care providers to computerize more of their information so more users have access to it. Nearly half of the survey respondents cited one of two factors as the driving force behind this computerization effort: managed care (25%) and the need for comparative patient outcomes data (24%), which compares the costs of various treatment methods.

What is your most frustrating IS problem?



Based on a survey of 1,033 health care professionals.

But while these reforms are driving the need for increased networking, most users pointed out that developing an infrastructure for information sharing has to take place first.

"We want the right foundations to begin with, and then give our outside clients the ability to link up with them," said John Miller, network administrator for HealthCare Compare, a managed care service in Downer's Grove, Ill.

Accomplishing that, however, will involve a number of network upgrades in hardware, software and overall infrastructure, according to the survey. Integrating systems across separate facilities, for example, will be the top IS priority over the next two years for 31% of survey respondents.

The most challenging problem these health care net managers face may be the migration to a client/server environment, which 21% of the survey respondents have already accomplished. An additional 34% are planning to tackle that migration within the next five years.

Anderson's Kohner said, "Client/server presents information in the fastest, most accurate way possible. We intend to use it to get everyone working in harmony."

As the health care industry begins to share more information, however, security will become more of an issue.

"There are still a lot of open issues regarding security, privacy, and confidentiality," Ross said. "We are still waiting for some way to send information requiring encrypted links between locations, but the cost right now is prohibitive. Security will become very important, and we must find some way to make those faculties less expensive."

Comments?

See "Contacts" box on page 2.

Data Comm MAGAZINE Top Performer MARCH 1994

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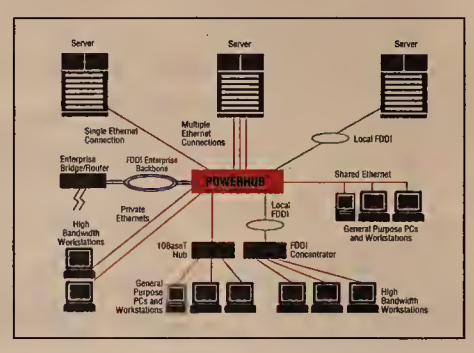

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Circle Reader Service #10

If you were linking 100 years of tradition with the next century, which premises wiring system would you spec?

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NETCONNECT Patch Panels bring maximum flexibility for the future to University of Rhode Island's advanced wiring specification.

When University of Rhode Island reviewed their networking environment five years ago, they followed a tradition of looking forward and set their sights on the next century. Today, URI runs its net on an areawide fiber backbone. Remote campuses are linked, and a master plan is taking shape.

One key in that plan is a premises wiring system from AMP — the NETCONNECT Open Wiring System. The University's horizontal wiring includes two Level 5 UTP cables for data and one Level 3 UTP cable for voice at each station. And, with an eye on new technologies such as ATM, the spec adds a two-pair STP cable to the mix.

At the user end, wiring terminates permanently to four-port AMP Communications Outlets, where changes are made with a simple insert swap. Inserts match equipment to the installed cable, and provide the correct connector. And for URI, the inserts also provide an upgrade path to higher-performance Category 5 levels. Wiring at the closet goes to similar outlets in patch panels. In tight spots, NETCONNECT 110Connect panels are used, with punch-down termination and a pcb interface to front RJ45 connectors.

Their wiring specification gives URI maximum room to grow, and their AMP NETCONNECT system gives them the ability to take maximum advantage of that wiring, now and in the future.

AMP and NETCONNECT are trademarks.

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65926

*Circle Reader Service #***8**

AMP

AppleTalk Control Protocol gains acceptance in WANs

BY BILL WOODCOCK

Although the AppleTalk Control Protocol (ATCP) got off to a slow start, that's beginning to change as users discover the ease with which it allows them to pass AppleTalk traffic across enterprise nets, and vendors are now racing to bring ATCP-compliant products to market.

ATCP was first described in November 1992 in The Internet Engineering Task Force RFC 1378 by Brad Parker, then vice president of research and development at Cayman Systems, Inc.

ATCP is one of a family of protocols that run on top of the Point-to-Point Protocol (PPP), which is quickly replacing the Serial Line Internet Protocol (SLIP) as the wide-area networking protocol of choice.

Unlike SLIP, PPP is capable of simultaneously conveying traffic in multiple, native, high-level protocols like AppleTalk, IP, IPX and DECnet. In order to do so, it requires the use of so-called Network Control Protocols (NCP), which tell it how to carry each of the higher level protocols.

The first of these, naturally, was for the Internet Protocol, standardized in May 1992 — at the same time as PPP. DECnet Phase IV, Open Systems Interconnection and AppleTalk followed soon after. And although the NCP standard for Novell, Inc.'s Internetwork Packet Exchange was not ratified until quite recently, it was actually implemented at the same time as the others.

REVOLUTIONARY SUPPORT

This standardized support for multiple protocols over wide-area serial connections is really quite revolutionary in that it finally lets sites with different vendors' WAN routers communicate using protocols other than IP.

While IP is still inarguably the single most vital protocol in the wide-area field, the addition of AppleTalk and DECnet have made many new services possible; ones which overcame some of the limitations of IP's static address configuration and central name resolution.

Not long after writing the ATCP protocol specification, Parker left Cayman Systems to start his own company, FCR Software, Inc., short for Faster, Cheaper Routers. FCR's first product was an ATCP and IPCP (IPCP is the IP Control Protocol used to carry IP over PPP) end node implemented in software for the Macintosh, which is now being distributed under license by InterCon Systems Corp., under the name InterPPP.

Something like an open-standard version of Apple Computer, Inc.'s Apple Remote Access (ARA) client, FCR's ATCP client was brilliantly executed, but useless in the absence of a router with which it could communicate. This vacancy was not filled until this February, with the appearance of ATCP support in Digital Equipment Corp.'s DECServer 700.

Tools to speed implementations

Vendors of development tools are rushing to bring programming and compliance-testing aids to market for products supporting AppleTalk Control Protocol (ATCP) over the Point-to-Point Protocol (PPP).

Midnight Networks Inc., for instance, has recently added an ATCP compliance validation suite to its Automated Network Validation Library (ANVL), which also tests AppleTalk and Internet Protocol routing and Apple Remote Access (ARA).

With the suite, programmers at router companies such as Cayman Systems, Inc. and Xylogics have initiated and received connections with their prototype PPP implementations, testing the whole connection process for compliance with PPP specification.

Pacer Software, Inc., the first company to develop an AppleTalk stack for Digital Equipment Corp.'s VMS operating system, is adding ATCP support in a PPP connection server.

ATCP support rounds out Pacer's library of portable AppleTalk and server code, which it licenses to a range of vendors that wish to use a core of proven software technology in their router hardware.

These AppleTalk-over-PPP products join an array of existing router, ARA and protocol stack code that have made their way into products from SynOptics Communications, Inc., Webster Computer Corp., Dayna Communications Inc., Asante Technologies, Inc. and Telebit Corp., among other well-known vendors in the AppleTalk market.

BY BILL WOODCOCK

Circle Reader Service #9

Hardly Macintosh-friendly, the DECServer requires both the Trival File Transfer Protocol and Boot Protocol to boot, so this solution only made sense on large multivendor nets, primarily those based on Digital routers.

All the while, Apple supported the protocol in word, if not in deed, and eventually announced a form of partnership with Shiva Corp., whereby Shiva would develop an ATCP-based AppleTalk wide-area server, and Apple would look on approvingly, eventually adopting the technology if it proved feasible.

Shiva added support for ATCP in Release 3.0 of the software for its LanRover router in June. The result is a formidable wide-area router, which can be easily configured and reliably routes AppleTalk, IP, IPX and several more minor protocols, all in native mode, simultaneously, over the same synchronous or asynchronous connections. It does all of that while also answering ARA 1.0 and 2.0 incoming calls, and allowing outbound modem pooling for Macintosh, DOS and Windows clients on the network.

Impressively, it all works, and LanRover 3.0 will be a hard act to follow for the wide range of vendors aiming for late 1994 and early 1995 release dates. Many of those vendors will be participating in an ATCP interoperability bake-off at the AppleTalk network trade show called Mactivity, in San Jose, Calif., late this month.

Engineers from each of the participating vendors will attempt to establish connections with ATCP products from other vendors — both those already shipping from Shiva, Digital and InterCon, and those still under development from other vendors — and spend the three days of the show fixing interoperability problems in a cooperative atmosphere.

TESTING THE WATERS

Although Apple has proclaimed support for PPP in the abstract for quite some time, details are noticeably scarce, and that is causing some vendors to shy away until Apple actually shows its hand. That is likely to happen this winter in conjunction with the release of Transport-Independent AppleTalk.

Eric Gould, ARA product manager, goes so far as to say that Apple will provide an ATCP client implementation, and that it is likely to be integrated into a single, remote-access software module with an ARA 1.0/2.0 client. There is no word, however, on whether the server will be based on Apple's software Internet Router platform or whether it will be a stand-alone product as the ARA servers have been.

Both possibilities make some degree of sense: The Apple Internet Router is mature, thoroughly debugged, has reliable AppleTalk routing capabilities, is adaptable to a variety of hardware configurations, is well suited to the addition of new connection methods due to its modular architecture and already supports AppleTalk Update-based Routing Protocol (AURP), the wide-area AppleTalk border-gateway routing protocol. The drawback is that it handles only AppleTalk routing and thus could not provide a multiprotocol solution.

On the other hand, a stand-alone product could more easily follow in the footsteps of Apple's previous ARA servers, familiar to a wider range of users and neophyte network administrators. Apple's ARA servers, however, serve end nodes only and have therefore never supported any sort of routing, AppleTalk or otherwise. Adding such support from scratch would make an already large project

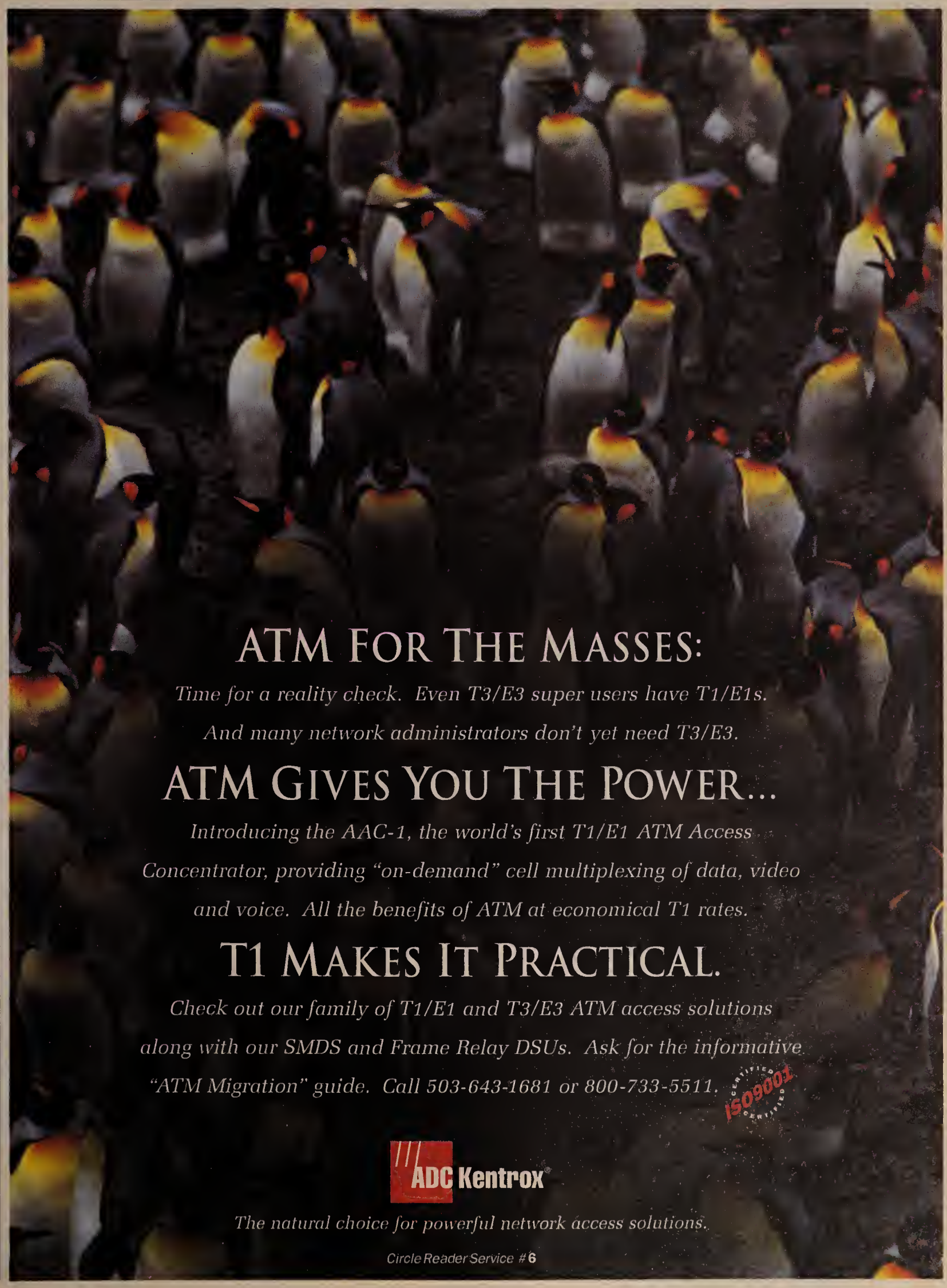
See **AppleTalk**, *page L6*

Sizing up router support for Apple networks

Vendor	Model	Number of ports	Price	Price per port	Protocol availability			
					ARA 2.0	ATCP	IPCP	IPXCP
Cayman	GatorAccess	10-30	$2,995-$4,995	$300-$166	Never	4Q '94	Now	Now
	GatorRoute	2	$3,285	$1,643	Never	4Q '94	Now	Now
Cisco	500-CS	8-16	$3,299-$3,999	$412-$250	4Q '94	1Q '95	Now	Now
	ASM-CS	112	$17,000	$152	4Q '94	1Q '95	Now	Now
Compatible	Microrouter	1	$1,695	$1,695	Never	3Q '94	3Q '94	3Q '94
Digital	DECServer 700	8-16	$3,690-$4,090	$461-$256	Never	Now	Now	Unknown
Livingston	Portmaster	10-30	$2,495-$3,750	$250-$125	Never	4Q '94	Now	Now
NEC	Dr. Bond	4-36	$3,090-$7,200	$773-$200	Now	1Q '95	Now	Now
Rockwell	NetHopper	1-3	$1,695-$3,495	$1,695-$1,165	1Q '95	1Q '95	Now	Now
Shiva	LanRover 3	4-8	$2,899-$3,999	$725-$500	Now	Now	Now	Now
	LanRover Plus	4-8	$4,299-$8,499	$1,075-$1,062	Now	Now	Now	Now
Telebit	NetBlazer	2-32	$2,699-$8,794	$1,350-$275	1Q '95	4Q '95	Now	Now
Webster	Multigate	4	$1,995	$499	Now	4Q '94	4Q '94	2Q '95

ARA = Apple Remote Access ATCP = AppleTalk Control Protocol IPCP = IP Control Protocol IPXCP = IPX Control Protocol

GRAPHIC BY SUSAN J. CHAMPENY



Generator

Continued from page L1

getting reports to customers by 75%. Besides saving time, Reporter gives Seibenthaler more options.

"The first beta version only let us do reports based on 24-hour periods, but the latest version fixed that, so now we can take hourly snapshots. That type of flexibility is important because these imaging systems are critical portions of our customers' networks."

With a router-based enterprise network that comprises more than 500 routers and hundreds of Ethernet and token-ring LANs across five states, Jim Runnels, senior telecommunications analyst at Ameritech Services Corp. relies heavily on 100 DSSs for network troubleshooting. Reporter allows him to be more proactive.

"Reporter allows me to easily baseline networks in terms of utilization and error activity, and compare those reports to spot trends," he said. "That allows me to identify a problem before a user calls in with a complaint, so I can stay a step ahead of potential trouble spots."

Runnels did not generate reports previously, so Reporter's automated generation of a document suite was a welcome feature.

"Reporter allows me take advantage of the information available to me through the DSS without spending the time developing my own applications or porting the information to a spreadsheet," he said. "The beta version has performed well. I had some issues with the documentation that came with the product, but Network General cleared that up quickly."

Available next month, Reporter costs $4,995.

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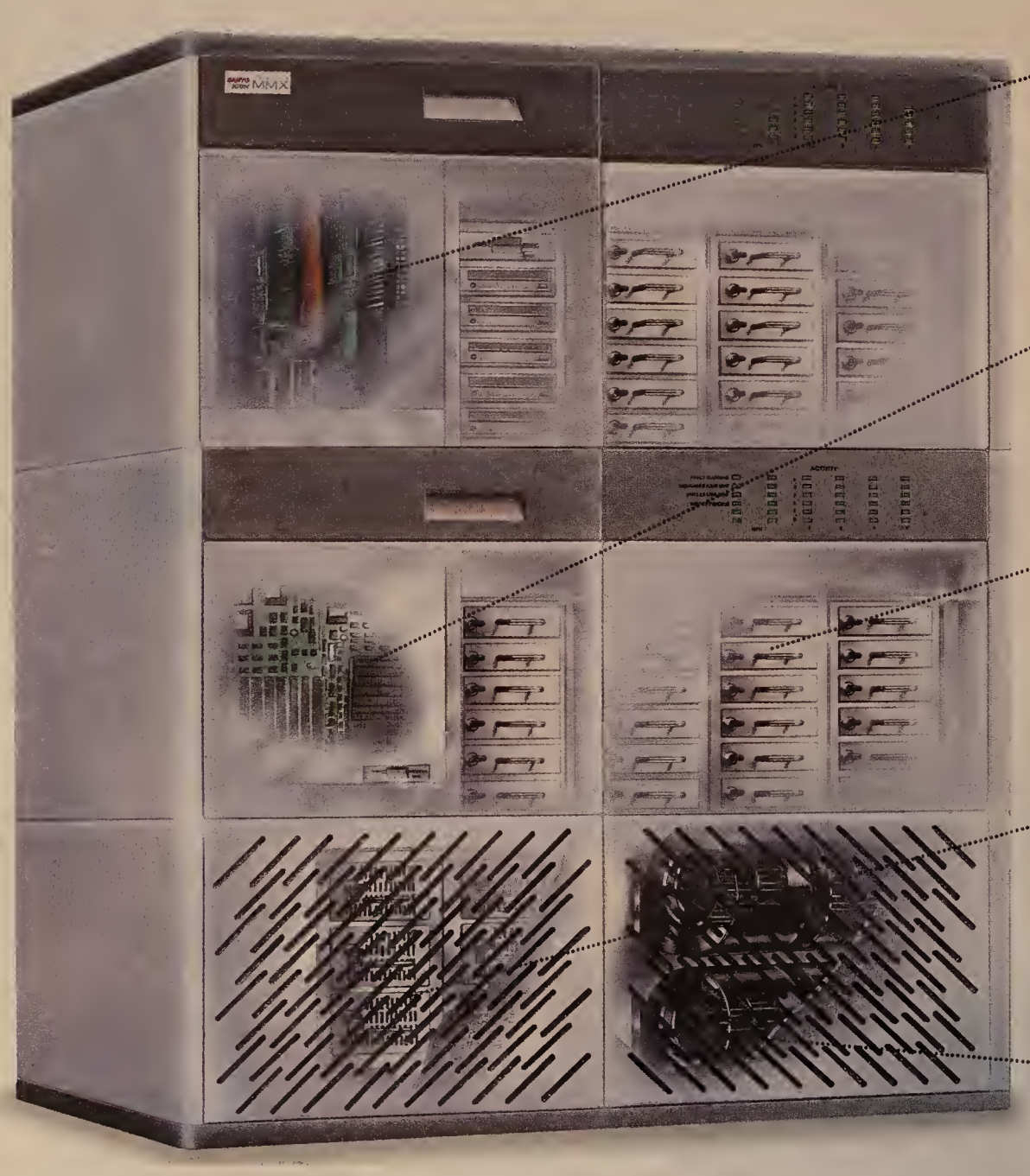

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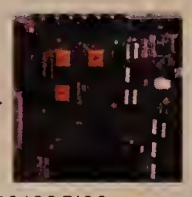
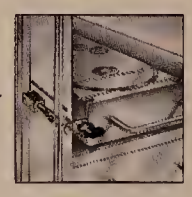


88100 RISC processor; up to 512MB cache.



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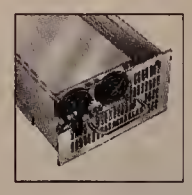

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Circle Reader Service #5

AppleTalk

Continued from page L5

even more time-consuming to develop as well as test.

In some ways, the latter alternative seems more likely. Surprisingly, Apple sees roaming notebook and laptop users of Microsoft's Chicago — which will contain an integrated PPP client, currently under development by Shiva — as one of the largest markets for its PPP server.

That being the case, support for protocols other than AppleTalk would outweigh the ability to route, which would tend to favor a standalone successor to Apple's current ARA servers, rather than an Apple Internet Router expansion module.

Apple's decision to continue pushing ARA 2.0 after the introduction of its own PPP implementation is a surprising one. The rationale is that ARA provides more efficient and feature-rich connections for users who will be employing AppleTalk only, or tunneling IP through AppleTalk using MacTCP. And while that depends largely on the application layer of the implementation than the underlying transport protocol, one suspects the company is justifiably afraid of alienating the large installed base of customers who are not on multiprotocol networks.

FUTURE DIRECTIONS

Although vendors seem to be aiming this first round of ATCP-supporting routers primarily at the growing remote dial-in market, with relatively low-speed asynchronous and a few DS0 synchronous offerings, it seems likely that large router vendors will follow suit.

Cisco Systems, Inc., Wellfleet Communications, Inc. and Proteon, Inc. can be expected to port ATCP to their high-speed, large-scale WAN routers, allowing large corporations to begin carrying native AppleTalk traffic between sites or campuses on their corporate backbones.

Limiting the chattiness of the AppleTalk protocol is, however, just as critical on a wide-area corporate backbone as over a narrow 14.4K bit/sec dial-up line — a problem vendors are just beginning to tackle.

Apple's AURP, a sort of AppleTalk-specific boundary routing protocol, seems well suited, but it has currently only been implemented in an IP encapsulation form. It also has been heavily attacked by the AppleTalk Networking Forum, a coalition of AppleTalk router vendors, many of whom accuse it of being overly ambitious or too much work to implement. They suggest a scheme called RTMP-60 instead.

Nonetheless, AURP would appear to form a good match with ATCP to make AppleTalk routing more palatable to heavily trafficked corporate backbones,and the vendors who have implemented the routing protocol have done so to good effect. In fact, users have created an "AppleTalk Internet" of intercommunicating AURP routers tunneling through the Internet.

Whatever the specifics of vendors' implementations, the success of this first generation of ATCP routers makes it clear that the future of wide-area and remote dial-in AppleTalk lies in PPP.

Woodcock is the president of Zocalo Engineering, an AppleTalk and IP network consulting firm-based in Berkeley, Calif., and is the author of *Networking the Macintosh.*

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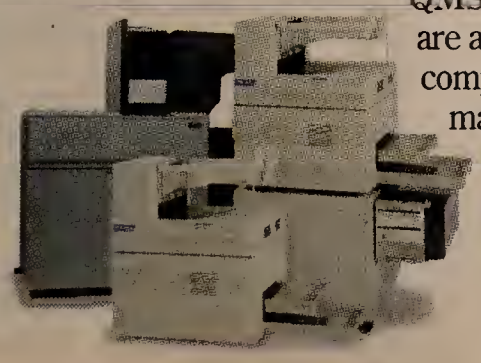

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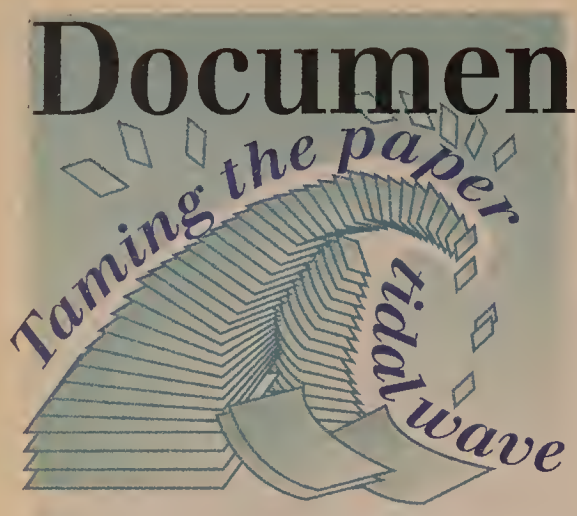
*Circle Reader Service #**11***

Documents from the desktop



BY MARK GIBBS

The paperless office has been a Holy Grail of office automation. But as we began to understand how PCs affected business practices, it became one of those goals that seemed like a good idea at the time but could not be achieved.

While there are still problems to solve before we can reduce all office information to bits and bytes, a new generation of desktop, personal document imaging systems is emerging that shows that not only can paper be practically and cost-effectively reduced, but it can be seen as a data type in its own right.

The idea of being able to eliminate paper has its roots in the rampant enthusiasm of the personal computer industry in the 1980s. Back then, the promise of the technology seemed to point to all paper-based transactions becoming computer-based.

Alas, this can now be seen as wild optimism. The fact is that the majority of the world is paper-based, and the average office worker swims in the stuff.

While your company may be computerized seven ways to Sunday, your customers and suppliers usually aren't. And even if they are, their systems are probably designed to produce paper. Paper, then, forms a major communications channel between organizations.

AFTER THE WAVE

Some organizations have attempted to deal with the incoming paper tsunami using document imaging systems.

As with any new technology, the earliest products were corporate-level solutions — they dealt with the management of documents that were related to the corporation's core business.

Product profile	
Manufacturer:	Visioneer Communications, Inc.
Products:	PaperMax and MaxMate
Function:	Personal document imaging system
Price:	$499
Location:	Palo Alto, Calif.
Telephone:	(800) 787-7007; (415) 812-6400

Tom Koulopoulos, president of the Delphi Consulting Group in Boston, claims that "95% of all corporate data is on paper," a figure discovered in a Delphi study of 400 of the largest 1,000 firms.

The study also reveals that only 5% of the companies surveyed had managed to translate more than 50% of their data into electronic formats.

Why should this be the case? The most important part of the reason lies in the nature of corporate-level document imaging systems. Targeted at volume applications and high speed, these systems cost about $600,000.

CORPORATE AND PERSONAL

And while corporate-level document imaging has become an established and effective business solution, it fails the organization in one important respect — it does not support personal productivity.

That is important. Without individual workers being able to electronically trap paper-based data, there is an implicit upper limit on how fast information can flow around an organization.

Low-end, or perhaps more generously dubbed personal software solutions, such as Watermark from Watermark Software, Inc. in Burlington, Mass. and LN:DI from Imagery, Inc. in Bedford, Mass., have appeared with price tags in the low hundreds. But the missing component has been hardware.

To lift data from the page usually requires scanners that cost several thousand dollars. So here you had a supposedly low-end system with a total cost of around $5,000, hardly a general personal productivity tool.

Yet the opportunities available if document imaging can be brought down to the desktop, particularly the networked desktop, are immense.

By allowing staff to digitize and file their own paperwork and integrate that data with

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optical character recognition (OCR) software, more information can be moved from paper to electronic storage.

The critical issue here is that the staffers do the work. They select and manipulate the paperwork to be captured and manage the storage and classification of image data. Once the images are captured, they can be stored on a network server and protected from loss in a way that is impossible with paper.

According to the Document Image Processing Supplement" in *VAR Business*, "studies show that workgroups lose 15% of the documents they handle and spend 30% of their time looking for them." So anything improving the ability of the group to track and find documents has a direct cost-saving benefit.

More importantly, electronic images can be sent, received and stored with other data types such as text, images and sound.

ENTER VISIONEER

Many vendors have tried to enter markets that are defined by expensive hardware but with low-cost systems offering similar functionality. The idea is to turn a corporate-level technology into personal productivity technology. In most cases, these endeavors fail because along with the price reduction comes a reduction in functionality. Once that is lost, it often becomes difficult to justify the purchase.

Visioneer set out to build a document imaging system that was not only priced suitably for personal productivity applications, but was simple to install and use.

But Visioneer Communications, Inc. in Palo Alto, Calif., has succeeded in maintaining functionality while reducing cost.

Visioneer entered the document imaging market with a novel approach. It set out to build a document imaging system including hardware and software that was not only priced suitably for personal productivity applications, but was alsosimple to install and use.

PAPERMAX AND MAXMATE

The Visioneer document imaging system consists of two products: PaperMax, the scanner peripheral, and MaxMate, the image management software.

The scanner is about 12 inches wide by less than four inches high and three inches deep. This makes it a suitable size for use on a desk.

Connecting the PaperMax scanner is simplicity itself. Plug it into the wall and use the circular DIN-type plug to connect it to a serial PC port. The system comes with a serial cable that has a 15-pin connector and a 25-pin adapter.

The scanner has no on/off switch and has only one control that is used for diagnostic setup and, when required, to select options prior to scanning.

Software installation is also simple. You can specify where data and program files can be placed. After the program files are copied from the single disk, Windows is restarted and a dialog box appears asking which COM port to use. When the PaperMax scanner is found, Windows is restarted and the MaxMate software is always available through Windows thereafter.

Simply by loading a document into the scanner, the capture process begins and MaxMate is automatically loaded. The average page takes about six seconds to scan.

The beauty of this automatic launch is that even in the middle of other work, papers can be scanned and work immediately resumed.

The MaxMate software presents a desktop on which small thumbnail document images can be arranged and grouped into multipage collections called stacks. The documents can also be zoomed-in for browsing and pages turned by clicking on them.

One of the few weak features of MaxMate is document naming. This is limited to DOS file naming conventions, which can make documents difficult to identify.

On the other hand, MaxMate also works with OCR software, facsimile services, electronic mail and Windows printing.

Simply dragging a document to the fax or E-mail icon will hand the file off to that application. And if an E-mail recipient does not have the MaxMate software, you can send them Visioneer's browser (available royaltyfree for Macintosh, DOS or Windows). Now paper, in the form of a document image, can be treated as a data type.

MaxMate also supports limited document annotation (which can be searched, allowing a simple indexing capability), highlighting and markup (text addition). All of these are visible to users of the browser applications.

MaxMate can also be used as a repository for document images generated or stored in your system. It can import TIFF, PCX and BMP files, as well as fax files if Delrina Corp.'s WinFax is installed.

MaxMate also introduces a new printer device under Windows so that documents can be printed directly to the MaxMate desktop.

PaperMax can scan documents from 8.5

See **Desktop**, *page L12*

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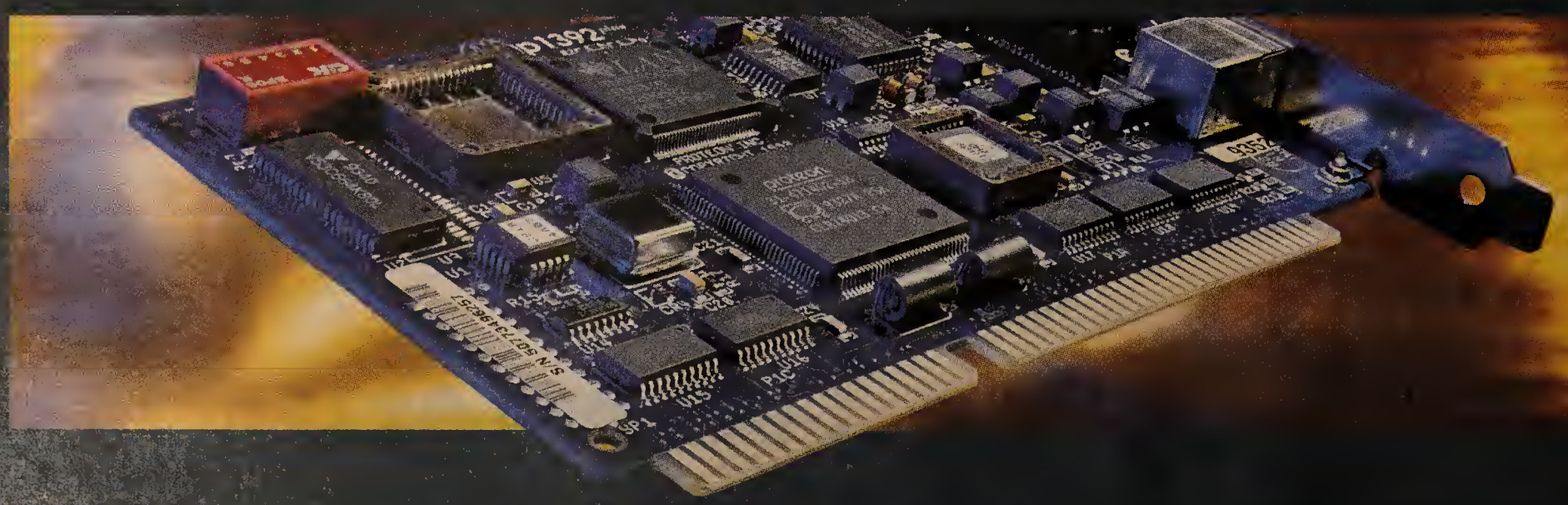

Document . . . or die

Investing in documentation can save you from disaster.

BY DOUGLAS WELCH

Despite sophisticated backup systems, uninterruptible power supplies and fault-tolerant servers, data is still at risk in most firms.

The lack of documentation for network systems and procedures could be just as damaging as a system crash, but few companies understand the need for documentation or the risk they are taking without it.

Change is the essence of a good company. Employees move, systems evolve, and hardware and software are constantly upgraded. Without accurate and clear documentation for network systems, it is possible that the loss of one staff member could cause major problems, up to and including the loss of data.

Network staff may come and go, but the net remains. Managers need to ensure that despite this flux they can continue to function and take care of the business at hand. Plan for the loss of important staffers by ensuring that the systems are well documented and more than one person understands their operation.

Prepare for the worst

Documentation is a safety net that will help prevent disaster. It can also be a way to develop your staff and help it stay on the cutting edge. While documentation might seem a daunting task, it's a fairly easy process to begin.

In one large firm, for example, an electronic mail administrator developed a system that kept the mail flowing throughout the company and other business units. When this person moved to a new position, the network managers suddenly confronted the black magic required to keep the system running.

No other staff member had any idea how the system was maintained or operated. In fact, no documentation had ever been written that explained the operation of the system. It was all contained in one person's brain, a truly dangerous position.

Luckily, the mail administrator had moved to another business unit and not left the company entirely. He was called back to repair a problem and prepare documentation.

GENERALLY SPEAKING

Besides helping to head off disasters, documentation offers many side benefits.

Excessive specialization is the bane of any good network group. Network staffers should endeavor to become computer generalists, and documentation can prove helpful in creating a cross-functional staff with the ability to easily move from one activity to another. This provides coverage for vacations, sick days, training time and situations where staffers are leaving the company or incapacitated in some way.

While such problems are not pleasant to think about, preparing for them can help remove their sting. Give every staffer the ability to learn and grow, and they will develop their skills accordingly. Writing documentation increases the understanding of systems, and reading it makes each network staffer more useful to the firm and their staffers.

Documentation also creates a flow of information between staff members. If one staffer wants to know how a certain system works, that staffer can read the documentation first. If well written, it should clear up basic questions, leaving the more difficult points for the more experienced staffers who are currently running the system. Make it easy for net staffers to research, configure and repair systems. It can only increase the quality of their work.

When most network managers think of documentation, it usually brings to mind boring pages of obscure technical information. What you will find in your own documentation though is a safety net that will help prevent disaster. It can also be a way to develop your staff and help them stay on the cutting edge. While it might seem a daunting task, it is easy to get the documentation ball rolling.

GET STARTED TODAY

All it takes to get started is the desire, some planning and a few minutes of time. Batch files, programs and configuration files can carry their own documentation by building comments at the beginning of each file.

In fact, this is probably the best way to document these systems. Everyone will immediately have the information they need when they open the file to edit. Paper copies of these files should then be stored in a safe, central location in case the electronic versions are destroyed. A quick printout of the file each time it is altered should then be added to the stored version.

Set aside and standardize the comments area so it is clear what information is required.

See **Documentation**, *page L12*

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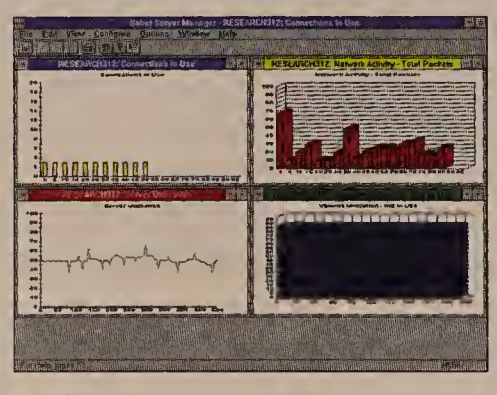

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*Circle Reader Service #***13**

Documentation

Continued from page L11

Provide instructions for the comments right in the file so staffers do not have to search for them. Be sure that every change to every system is noted.

This is especially important when you have several people working on files over time. Internal comments can help reduce the chances of one staffer making a change and another undoing or repeating the same change.

Network hardware can be documented in much the same fashion. If special instructions are required to bring up a file server, hub or router, these instructions, along with configuration information, should be attached to the hardware.

More detailed procedures or systems will probably require some type of formal documentation. Make it easy to develop. Create a standard format for all documentation, and store these template files and the finished documents in a central location where any staff member can find them.

These documents should be reviewed and updated on a regular basis. Out-of-date or inaccurate documentation can be worse than no documentation at all. These documents are works in progress, just like any network, and they should reflect the actual environment as much as possible.

Most documentation should be no more than two or three printed pages. Anything longer could indicate problems with the system being documented.

Documentation provides network managers with a proactive way of searching out problems in their operations without complicated formal analysis. If a system is requiring large amounts of documentation, staffers should provide recommendations about how the system could be simplified. While documenting a bad system may make it easier to operate, it will not make it better.

Documentation should be part of any network project, no matter how small. Time for creating documentation should be included in the initial project schedule, and the project should not be considered complete until the documentation is complete.

Do not fall victim to the usual apathy associated with documentation. Too often ignored or rushed, the reality is that poor or missing documentation will surely cause problems.

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IDG

Desktop

Continued from page L9

inches wide by 30 inches long down to the size of a business card.

Storage is, of course, a concern for document imaging systems. Image file sizes for a single 8.5- by 11-inch page saved in MaxMate's own .MAX compressed format range from 720 bytes for an empty page to about 50K bytes for a page of dense text.

IS IT WORTH IT?

The first day I got the system running (a remarkably simple process), I found that I committed just about every piece of paper I could to MaxMate. Suddenly, my desk was clear!

The simplicity of operation and the integration between the scanner and the software makes using the system easy. While there are many aspects of the software that could use improvement, none are bad enough to detract from the overall efficiency of the system.

"Visioneer has made a quantum leap in commoditizing imaging by bundling together all of the components required."

For example, while the file naming limitations are clumsy, I did not really find it difficult to identify documents among the hundred or so stacks I created during the first morning.

Moreover, when a colleague called and asked if I had a document he needed, I was able to find the image within seconds in a stack I had created for press releases for June. I was then able to fax him the appropriate pages by simply dragging them to the fax icon.

I find this one of the most exciting products that I have looked at for some time. Its cost is low enough that there is little to stop you from at least getting a few to experiment with.

Without a doubt, Visioneer will not be the only vendor in this market for long, but it definitely has an edge that will take some beating when it comes to the scanner hardware and its integration with the imaging software.

Delphi's Koulopoulos agrees. He says, "Visioneer has made a quantum leap in commoditizing imaging by bundling together all of the components required."

In the network environment, this is a product that could not only improve collaboration and efficiency, but also might be the first generally useful imaging product to help control the paperwork tidal wave.

Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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NET RESULTS

by Mark Gibbs

Empowerment and opportunity

An interesting distinction has emerged between two sets of desktop users, what I'll call "power users" and "empowered users."

I was recently talking with Tom Koulopoulos of the Delphi Consulting Group about some new products from startup Visioneer called MaxMate and PaperMax. The products form a low-cost ($500!) document scanning and imaging system that works at a personal productivity rather than corporate level.

The products will enable users to scan their own documents into their personal computers rather than relying on a centralized scanning and document imaging system focused only on documents that relate to the company's core business. Incidentally, this is potentially a big step toward a paperless office.

Tom pointed out that this was an example of a product being designed to empower users. He said Visioneer has taken a different strategy than most vendors, whose products are designed for power users; the people at your company know all of those wrinkles and tricks in a software package and actually use them.

By way of example, just think of products like WordPerfect or Excel. They are death by features.

In these and other products, there are many features that 90% of users probably will never touch. Yet vendors market those features as if they make the product superior, trying to tempt the power user.

But it is those products that allow average users to do things that were previously restricted to the domain of corporate operations that make users empowered and more autonomous. The products also help users become more effective and efficient.

EMPOWERING CONSEQUENCES

But what does empowering users in the network environment mean and what are the consequences?

Consider the average network user. Most of what goes on with a user's network connection is pretty much hidden from that person. The user's work environment appears more as an extended PC rather than a networked PC.

If you try to empower such a user, the user actually has to understand the environment in which he or she is working.

The user needs to know not only how to do things, but also why things happen or don't happen.

For example, users need to understand how to access servers and what it means when they find that they don't have the required privileges.

Most importantly, they need to understand their responsibilities and authority.

For network managers, this poses two problems up-front. The first is the need for workstation software and hardware that empowers users to run their own connections. There isn't a lot of this around yet.

The second is the need for the all network users to be educated to a depth that we usually avoid.

If those two problems may sound overwhelming, consider the payoff in solving them. Get the formula right and your support costs should drop dramatically and so should your network management costs.

Your job then becomes one of keeping the network infrastructure running and not handholding users who ask you questions such as, "It says press any key but I can't find a key marked 'any' ".

The downside is that with a more educated user population, there will be more pressure on you to provide advanced services.

The empowered user is a pretty novel idea. It will take effort on your part to implement but will make your network more efficient and your users more effective.

But lest you think this will cure your workload, think again. As the physician Jonas Salk wrote, "The reward for work well done is the opportunity to do more."

Gibbs is a consultant and writer in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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Circle Reader Service #2

The LAN glass house

Users meet the challenge of managing critical LAN applications by applying age-old lessons of centralization, consolidation and control.

BY JOANNE CUMMINGS

As departmental file servers evolve into enterprise application servers, users are finding it tougher and tougher to manage and administer them properly.

As a result, many information systems (IS) groups are taking control of the machines, moving them into central locations complete with climate control, uninterruptible power supplies (UPS) and restricted access. They also often take the opportunity to replace multiple low-powered machines with fewer, more powerful platforms.

Call it the back wash of the distributed computing wave.

"It's only when we start thinking of LANs the same way we thought of mainframes, and apply the same security and management, that we'll really start seeing the benefits of LAN computing," said William Harrison, director of networking and systems support at the Dana Farber Cancer Institute in Boston. "And the whole key to that is being able to manage them centrally."

Centralization enables users to manage complex local net applications to a higher degree of consistency and with fewer staffers. "It is a much more cost-effective and easier management structure," Harrison said. "The economy of scale we're seeing is in human resources; it just takes fewer people to manage the servers when they're centrally located."

Others agree. "Centralization absolutely makes management easier," said Joe Busch, systems supervisor at Miller Insurance Group, a Fort Worth, Texas-based insurer. "Our servers were distributed at one time, but we centralized them when we decided it was time to set standards. IS took responsibility for the systems to ensure backups, recoveries, off-site tape storage and setting up standard configurations. Once we took ownership, we knew we needed to centralize them just as an ease of administration thing."

Scudder, Stevens & Clark, Inc., a mutual funds company in Boston, moved from two buildings into one at the end of May and collocated the servers that had previously been distributed among four different IS groups.

"Now we can have two people doing server backups, whereas before we needed four," said Vice President Dennis Sullivan. "In a sense, we have a net gain of two people who can do things we couldn't do before because we didn't have enough resources. Centralizing the servers should net us an increase in productivity."

In addition to staffing boons, centralization also makes it easier for network managers to provide consistent, standard application support in a distributed environment.

"In distributed computing, you're putting a lot more computing at the client end, but you're also changing your server in that it's now your database system," Harrison said. "It's running the heart of the application, and it's got all the data. You can't afford not to have that available. Management and access to it are all that much more critical."

This means the network must be designed to accommodate that access. "You can't start designing a reliable architecture if your servers are all over kingdom come," he said. "It has to be designed with centralization in mind."

Jeff Johnson, director of accounting systems at Chicago and Northwestern Transportation Co. in Chicago, agreed in part. His company's file and print servers are currently decentralized to be close to the end user. But the firm's database servers are centralized in the data center.

"Our database servers have always been in one of our mainframe computer rooms," he said. "They handle the critical applications and

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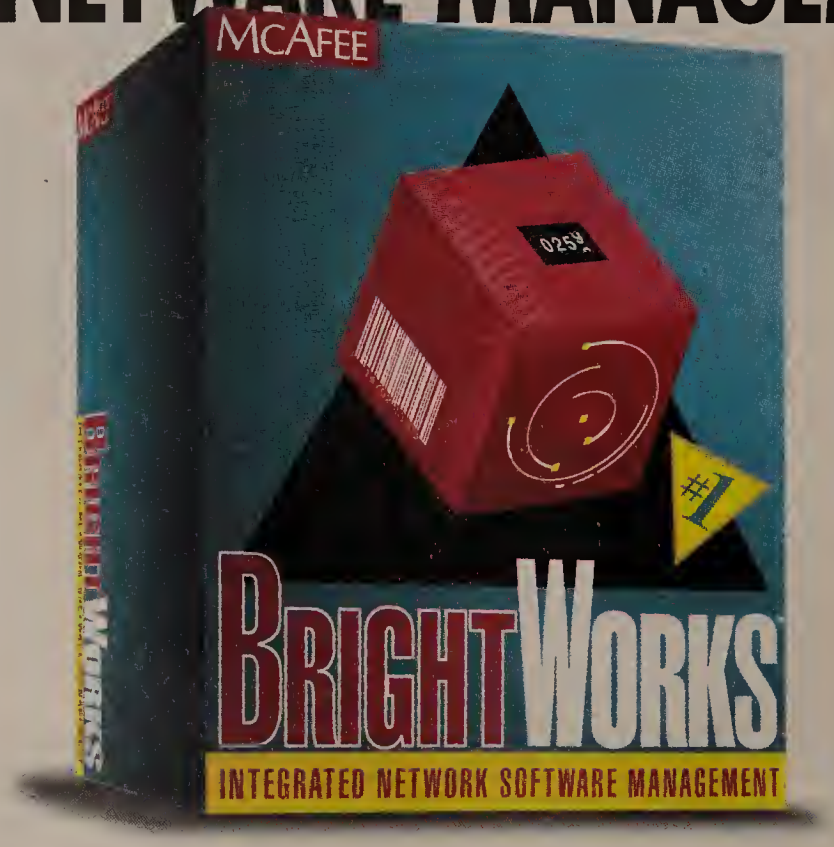

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were put there for a matter of convenience. The room is secure, it has a reliable power supply and a backup diesel power supply. We also have [all of the servers] on UPSs."

Eventually, Johnson said, his firm will likely migrate the other servers to the computer room, as well. "Our network has grown to the point where we've been installing routers, and the router technology has come along to the point where we don't need the servers out near the users," he said. "We probably will move some of those into the mainframe glasshouse-type rooms because then they would be easier to maintain, rather than traveling all over the place."

CUTTING COSTS

Centralizing servers can also lead to savings through consolidation, according to users.

"I think most of the original reasons for going with multiple servers have been eliminated by the technology," Johnson said. "The performance has improved so much, the cost has gone down so much and the networks have grown so much that from an administration standpoint, you almost need to start consolidating things."

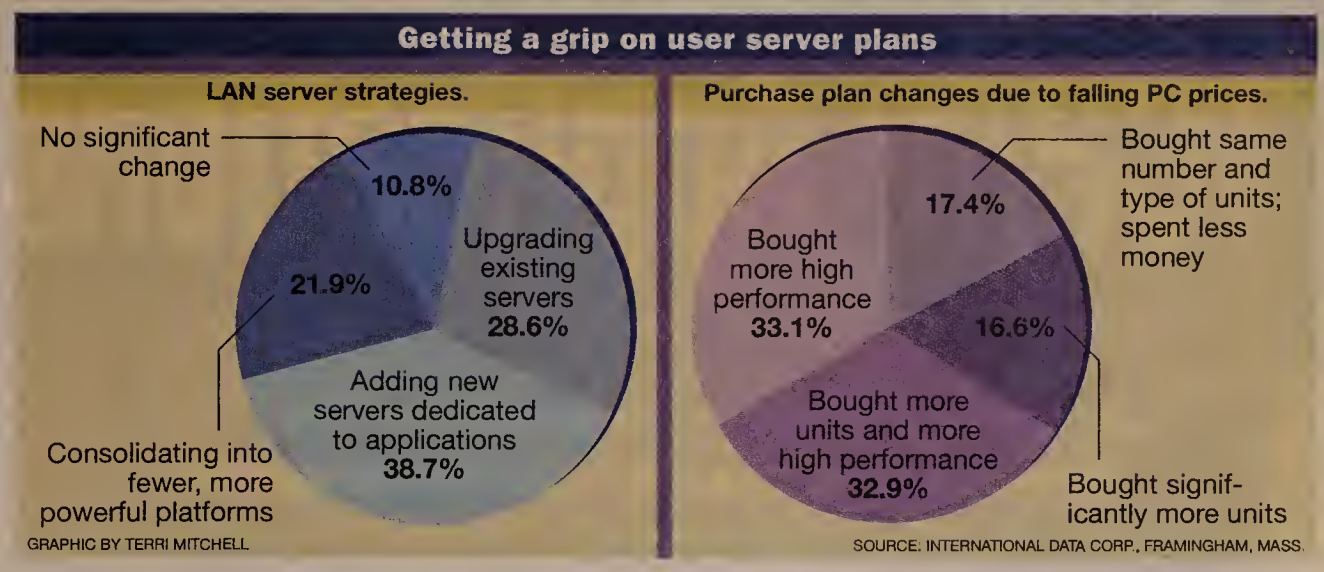
Until three or four years ago, the technology was not available or was too expensive to consider consolidation, he said. "Now you can buy a more powerful machine, more disk drives and put more memory in," he said. "Before you couldn't do that because cost was a big factor and the machines were limited in how much memory you could add. Also, the CPU was slower so you wanted to try to distribute things."

The Foxboro Co., a process control system manufacturer in Foxboro, Mass., consolidated its machines when it centralized its departmental servers about five years ago.

"Now that the servers are centralized, the challenge will be to maintain a higher level of service so the departments don[t feel they've given anything up," Sullivan said.

"Centralization is smart from the point of view of savings, because then you can get rid of some platforms that aren't really needed," said Houghton LeRoy, director of systems integration at the firm. "We originally had about 20 servers total, and now we're probably down to about one-third of that."

Foxboro accomplished this by moving to fewer, more powerful machines. "We went from old DEC systems to RISC-based platforms," LeRoy said. "And we reduced the number of our vendors, as well. Fewer vendors to deal with is also more cost-effective."



And once the servers are in a central location, other equipment can be optimized. "The real advantage is it's less expensive to have one place that you control vs. multiple places that you have to control," LeRoy said. "You can use one more powerful system rather than a lot of smaller systems, and you can save on things like UPSs. We have one UPS for the whole control room as opposed to multiple UPSs around the company."

There are some factors, however, that work against centralizing LAN servers, according to users.

"When you centralize, you tend to create more traffic on your backbone," LeRoy said. It makes sense to have the majority of servers centrally located but some distributed servers to handle local requests and reduce backbone traffic.

Another consideration is support. "I wouldn't centralize a server if we weren't able to provide adequate support," Miller's Busch said. "If IS doesn't have the resources or is unable to dedicate those resources, you should decentralize the servers and let the user departments handle them. You lose control then, but if you're not going to support it, it really doesn't matter."

Sullivan from Scudder, Stevens agreed. "Now that the servers are centralized, the challenge will be to maintain a higher level of service so the departments don't feel they've given anything up," he said. "The level of support becomes a more critical factor. But now that the servers are centralized, providing that support should be easier."

Dana Farber's Harrison said the decision to centralize or decentralize depends on the role of the server.

"I can't think of any reasons for not centralizing [LAN servers], given the opportunity, unless they're autonomous systems that aren't part of your enterprise network," he said. "But if it's part of an enterprise network, it should be managed like an enterprise system, and that can only be done if they're all in a central location."

Cummings is a free-lance writer based in Marlborough, Mass.

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Airport

Continued from page L1

bit/sec Optical Carrier (OC)-3 rings tied together via a 2.48G bit/sec OC-48 backbone.

"The OC-48 ring is only 20 feet long, but you have to have it to bring all of the OC-3 rings together and give you redundancy; so if you lose one ring, you don't just drop everything out," Parsons said.

Eleven Fujitsu Network Transmission Systems, Inc. FLM 150 ADM switches support the OC-3 rings, while two FLM 600 ADMs, which are located in the airport's switching center, support the OC-48 backbone. Individual T-1 channels are broken off the SONET net by Reliance Comm/Tech DISC*S intelligent channel banks.

"This is the same system US WEST uses for local distribution — Fujitsu SONET and the DISC*S," Parsons said. "We were trying to make it look like the public switched network so the airlines wouldn't be looking at something unfamiliar."

DESIGNING IN THE DARK

The data network, on the other hand, was a bit more complicated. It had to fit the needs of the various airport tenants — mainly the airlines and the city. Each had established communications nets based on different standards.

"United [Air Lines, Inc.] was token ring, the city was Ethernet, some people were 10Base-T, some weren't. Some were on [asynchronous] terminals," Parsons said. "No matter what we chose, we were going to have the same problem — we were going to have to integrate everything else into it."

"We really designed in the dark. When we did the original design work, we only had one airline signed up, and it was in bankruptcy."

Another problem was Greiner had little idea exactly what requirements each airline would have, or even where each would be located. The buildings were shells, and there were no space assignments.

"We really designed in the dark," Parsons said. "When we did the original design work, we only had one airline signed up — Continental — and it was in bankruptcy."

Greiner pushed the airlines to explain what they would need and took its best guess as to how to accommodate them, he said.

The result was an FDDI backbone based on 19 Wellfleet Communications, Inc. routers — two Concentrator Nodes, 16 Link Nodes and one Access Feeder Node. They support more than 30 Fibermux Corp. Crossbow hubs.

Airlines will connect into the net via universal outlets located throughout the airport. Each outlet supports multiple types of voice and data jacks, the only caveat being that, to keep things simple, Category 5 twisted-pair wire must be used for data.

That basic internet infrastructure will be shared by nearly all the airlines, with the notable exception of United.

"United's requirements were so large they could justify their own dedicated [FDDI] ring," Parsons said. Aside from using fiber cable and Wellfleet routers supplied by the city, he said United is pretty much on its own.

That is the case at most airports, where airlines install their own networks and consequently are free to do as they please. But many airlines are coming around to the shared-tenant concept employed at DIA.

"We can see initial capital cost being reduced 40%," said Dewayne Smith, project manager for communications with EDS Corp.'s transportation business unit. EDS provides telecommunications and data processing services for Continental Airlines, Inc.

Having multiple users sharing the cost of the network backbone makes it feasible to use high-speed nets like FDDI, which Smith said has seen limited use at most airports to date.

"This is the future," he said. "This will allow a lot more bandwidth so we can provide more applications to the user's desktop — graphics capability, all those type of things."

Milton Robinson, installation project manager for the SABRE Computer Services division of American Airlines, Inc. was likewise bullish on the shared-tenant concept.

He said the high-speed backbone enabled American to install all of its servers in a central location, saving on equipment and maintenance costs. Typically, the servers supporting the main ticket counters have to be in the main terminal, while those supporting the rest of the airline operations — everything from baggage handling to electronic mail and word processing — are located in another office facility.

"Normally, you need to lease circuits at the airline's expense to connect these buildings that are geographically separated," he said. And leased lines that are fast enough to support high-speed access to centralized servers would not be cost-effective.

The shared-tenant strategy also works well for the landlord, said Ivan Drinks, director of Management Information Systems at DIA. Since the city owns the network infrastructure, it can more easily keep track of what's installed.

See **Airport**, *page L18*

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Circle Reader Service #1

Airport

Continued from page L17

That was not the case at Denver's Stapleton Airport, Drinks said. When an airline moved out, the city had no way of knowing what circuits it had installed and where they all went, which essentially rendered them useless.

At DIA, the city is tracking all circuits using Auto-trol Technology's KONFIG cable tracking system. KONFIG can show cable runs overlaid on the background of a building so users can tell what will happen if they move a wall, for example.

It also lets users create work orders that tell technicians exactly how to run wires for new equipment and can provide listings on all circuits running through a particular device. The city is working with Autotrol on an upgrade that will enable the system to find the best route between any two points, rather than having the user make that determination, as is the case today.

The shared-tenant picture is not all rosy, however. Among the thorny issues it creates is network management, which gets tricky because the city owns the infrastructure, but not the computers and other equipment attached to it.

"Management is going to be a challenge," Drinks acknowledged.

US WEST, Inc. which installed the network, has also been hired by the city to manage the infrastructure. "That forces some of the responsibility back on US WEST because they have to live with what they installed," Parsons noted.

The carrier is using Hewlett-Packard Co.'s OpenView, Fibermux's LightWatch hub management system and Fujitsu's FLEXRPlus to manage the SONET net. But each airline needs its own system to monitor the health of its own equipment, and there must be close communication between the US WEST crew and the airlines to sort out who's responsible for various problems.

Another issue when sharing a backbone is how to keep each airline's data separate.

"When we first brought it up, everyone could see each other's rings," EDS' Smith said. Improvements to the filtering mechanism in the Wellfleet routers fixed that problem, however. "Fortunately, we're not receiving the brunt of the pressure because of the baggage problems."

Indeed, DIA's opening, originally scheduled for October 1992, has been pushed back numerous times because of much-publicized problems with an advanced baggage-handling system. The city has yet to set a new opening date for fear of missing another deadline.

Parsons washed his hands of responsibility for those problems, however.

"The baggage system does not run on this net," he said.

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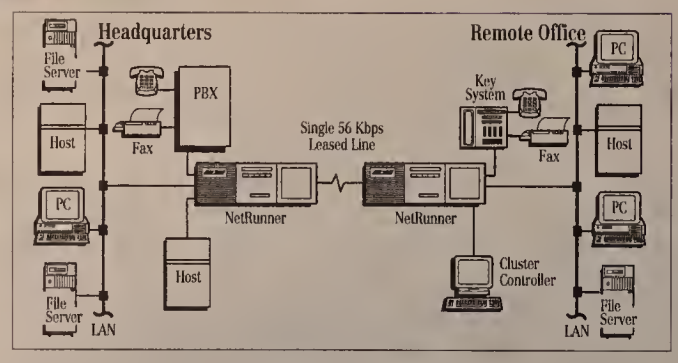

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Circle Reader Service #12

Novell hints it may begin to sell direct

BY CARYN GILLOOLY

Provo, Utah

Novell, Inc. executives have hinted that the company will begin offering NetWare and WordPerfect Corp. customers a choice of direct or reseller support this fall.

Novell is expected to announce in September the option of direct support to some of its largest customers as well as to customers of its retail-oriented products, such as Novell DOS.

Meanwhile, WordPerfect customers are expected to be offered the new option of reseller support. WordPerfect, which was acquired by Novell earlier this year, traditionally provided direct support to its customers.

Resellers said that many of their NetWare customers are WordPerfect customers, as well, and that a single source of support could be well received.

"This will definitely improve support for WordPerfect customers," said Terry Calloway, president of Data Technique, Inc., a Novell Authorized Service Center and gold reseller in Pittsburgh, Kan. "Customers have been finding it harder to get quality support for networking problems from WordPerfect."

From the Novell perspective, customers have long complained about a lack of direct support.

"I've had a lot of bad experiences with resellers with their lack of knowledge," said Chris Thomas, manager of technical services at Bramalea, Ltd., a NetWare customer in Toronto. "I choose to buy support calls, but those cost between $150 and $200 per incident. I don't mind paying for support, but that price is a bit ridiculous."

Jan Newman, senior vice president of services for Novell, stressed that customers will not be forced to change from their current support structures; they will just have more choices.

"Our main message is we want to make sure customers understand that we're committed to continuing to deliver the same type and level of support they're getting now," he said.

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LAN/WAN Interfaces Full Offering	No	Yes 100/140 Mbps TAXI, 155 Mbps SONET/SDH, 45 Mbps DS-3, 34 Mbps E-3
Supports LAN & WAN	No	Yes
Signaling Standard UNI (Q.2931) & NNI	No	Yes
Switched Virtual Circuits	No	Yes
Permanent Virtual Circuits	Yes	Yes
Traffic Type	IP Unix Only	All IP, IPX, NETBEUI, Appletalk, Unix, NetWare, Windows NT, Windows for Workgroups, Apple System 7
Redundancy	No	Yes
Traffic Features		
Shaping	None	Source
Policing	None	Dual leaky buckets
Congestion Management	None	FECN
Priority Levels	Single	Multiple
Network Management	Yes	Yes

International market cracking open

Global 800 services are en route

BY JOANIE WEXLER

The first commercial pan-European 800 service is scheduled to arrive this fall, a potential boon to companies looking to advertise globally using a single toll-free number.

The Dutch telecommunications carrier, PTT Telecom Netherlands International Telecommunications, intends to launch in September a pan-European 800 service, a company spokesman said. He said PTT Telecom has already signed agreements with Germany, France and the U.K. that would allow companies to locate in any of those countries or the Netherlands call centers that would be accessible via a single 800 number throughout Europe.

Further international service could follow. PTT Telecom negotiations are under way with other European carriers, as well as carriers in the U.S. and other parts of the world, to get cohesive 800 service running around the globe, according to the spokesman.

"It's tough to calculate exactly, but you're talking millions, if not billions, of dollars at stake in name recognition with 800 numbers," said Bill Coopman, manager of telecommunications at Deere & Co. in Moline, Ill., and chairman of council for the International Telecommunication User Group.

The PTT Telecom effort is one of many under way to deliver global telecommunications offerings that knit together features, service levels, points of contact and billing (see story, this page).

In this case, the ability to merge multiple call centers could be a potential operational benefit to 800 customers because of the single-number, cross-country access.

Some users said consolidating call centers would yield the same efficiencies as combining data centers: economies of scale for training, security of a centralized operation, and a single set of national laws and union rules.

On the other hand, at Rye, N.Y.-based Avon Products, Inc., where most of the business is international, "right now, we have separate databases for each country; we'd

See **800 service**, *page 33*

Regulation helps cross-border nets

BY JOANIE WEXLER

The competitive spirit of the U.S. telecommunications industry is beginning to seep across country borders.

The U.K. is planning to award AT&T a license to operate as an in-country telecommunications carrier in its own right, rather than being confined to reselling existing services from U.K.-based carriers such as British Telecommunications plc and Mercury Communications, Ltd.

PELSON

Although AT&T will still have to purchase circuits from U.K. carriers, it can modify features and pricing to be consistent with what users have come to expect in the U.S., said Dianne Bernez, a spokeswoman for the AT&T-led WorldPartners Association, a group of carriers that have banded together to provide customers with cohesive offerings, service levels and billing worldwide (see graphic).

AT&T services within the U.K. will emerge at the end of the year, said Victor Pelson, chairman of AT&T's global operations team. AT&T will eventually extend the U.K. services to its WorldPartners alliance, adding another country in which all WorldPartner members can provide alliance-standard services.

The AT&T-in-the-U.K. nod follows the U.S. Department of Justice's approval last month and the Federal Communications Commission's blessing earlier this month of BT's 20%

See **Regulation**, *page 32*

WorldPartners update

Founding fathers AT&T, Japan's KDD and Singapore Telecom began general availability of frame relay and virtual private nets this month and are scheduled to offer private-line service by the end of the summer.

Partners Unisource (Europe), OTC Telstra Australia and Telecom New Zealand International plan to start taking orders in the fourth quarter for all 3 WorldPartners services.

BRIEFS

The **Federal Communications Commission** has told telephone companies to start reporting **service outages** affecting at least 30,000 customers for at least 30 minutes. In lowering the threshold from 50,000 customers, the FCC tripled the number of central offices required to report outages. The FCC also required the reporting of all outages affecting major airports, 911 facilities, nuclear power plants, major military installations and key government facilities.

Sprint Corp.'s 800-service **revenues** were up a whopping 32% in the second quarter of 1994 as compared to the second quarter of 1993. Sprint's overall revenues rose 12% for the quarter as compared to the same period a year ago.

US WEST, Inc. is buying a pair of cable television systems in Atlanta with the intention of eventually launching interactive multimedia services over the networks. In a transaction valued at $1.2 billion, the carrier will acquire **Wometco Cable** and **Georgia Cable Television and Communications,** which serve 466,000 households. Competition for local phone service is currently barred in Georgia and other states, but Congress is considering telecommunications legislation that would override that ban.

MCI Communications Corp. is helping businesses fight **toll fraud** with the publication of a "Telecommunications Fraud" prevention manual, available free to MCI business customers through the carrier's sales offices. The 112-page booklet tells companies how to outwit hackers by restricting access to voice mailboxes, adding security on maintenance ports, training employees on fraud and restricting call attendant options on international calls.

Wireless users being told to give up their numbers

BY DAVID ROHDE

Washington, D.C.

Users are at risk of losing their cellular phone numbers to telephone companies that are forcibly removing them as part of a frantic attempt to avoid running out of telephone numbers.

In a recent filing with the Federal Communications Commission, the Personal Communications Industry Association (PCIA) bitterly complained that wireless carriers in New York, Chicago and Los Angeles are being told to "return" telephone numbers and prepare to move all wireless numbers to new area codes overlapping the geographical boundaries of the old area codes.

"McCaw [Cellular Communications, Inc.] has had to hire mobile vans to track people down in their offices," to get their cellular phones and reprogram them, said Scott Ellison, issues manager for the PCIA.

The association asked the FCC to direct NYNEX Corp., Ameritech, Pacific Bell and the California arm of GTE Telephone Operations to treat all number requests in a nondiscriminatory fashion.

Late last week, officials from Pacific Bell, paging and cellular companies, the California Public Utilities Commission and the FCC were to meet in Pasadena, Calif., to hammer out a solution.

The complaints from the wireless community come amid recent bulletins from Bell Communications Research warning that five area codes are now expected to run out of numbers before new area codes can take effect (see graphic). Surprisingly, of the five, two — 310 and 708 — are themselves relatively new area codes.

Out of stock

These area codes are in danger of running out of numbers before new area codes arrive:

Area code	State
205	Alabama
305	Florida
310	California
708	Illinois
713	Texas

GRAPHIC BY TERRI MITCHELL

In California, the new code drew a crowd when it was introduced, especially among wireless users, and some of those users are paying the price. Choosing to be in the 310 area code "was kind of a nouveau riche thing — kind of like Beverly Hills 90210," said Bruce Bennett, Pacific Bell's administrator for central office codes, based in San Ramon, Calif.

More declarations of area codes in jeopardy are on the way, said Stan Washer, manager of network planning for BellSouth Telecommunications Corp. "I fully expect there to be another three or four, and there could be more," he said.

Bellcore cannot provide the new area codes fast enough to avoid jeopardy situations. No more traditional area codes are available, and each of the new-style area codes going into effect starting next year — those with a middle digit other than a 0 or 1 — must carry a permissive period of several months during which callers can use either the old or new number.

In a scarcity situation, Bellcore directs the telephone companies to take steps such as assigning customers to distant exchanges where more numbers are available.

Since toll charges are determined based on the location of the central office, the phone companies have to reprogram their switches to be sure that customers are not improperly charged for toll calls, Washer said.

And more telephone companies other than those in the nation's three largest cities may take wireless users' numbers. Within the BellSouth territory, for example, such action is being considered in the Atlanta and Miami areas.

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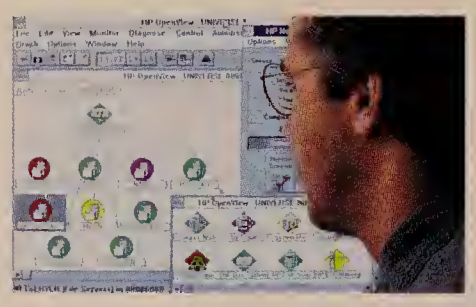

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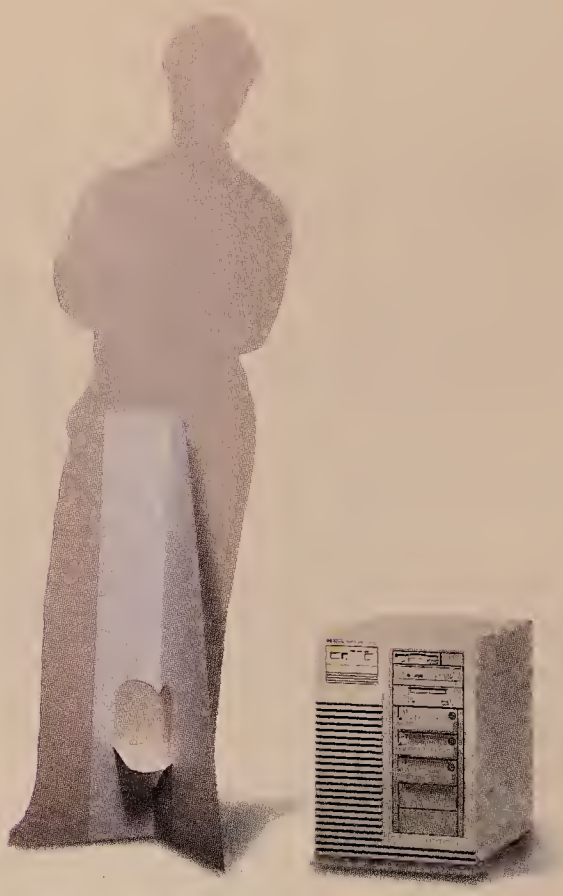


Check error logs and diagnose your server across campus.

Power cycle the server in Kalamazoo.

Open a window on the world.

MANAGE EVERYWHERE, FROM ANYWHERE.

For more information on HP's PC networking products, complete the business reply card next to Page 17.

What's missing is a unifying strategy, an organizing principle for all of the technological developments in PC networking, ensuring that the four major challenges are being met not just on paper, but with real products that resolve thorny networking issues in the real world

Networking: Today's Imperative

As networks evolve toward the ideal of providing high-speed access to any kind of information, at any time, in any location, the role of PC LANs has been evolving to keep pace. Four major trends are evident: PC LANs today are becoming larger, more capable, and more complex. More mission-critical applications are migrating to PC LANs. The cost of managing these LANs is increasing. And the demand for multimedia, which has hovered on the technological horizon for a couple of years, is beginning to be a factor in network design.

The challenges are clear. The responses of many PC networking providers, however, seem scattered. They present the market with a series of disconnected tactics, addressing only individual elements of the problem: more standardization to reduce complexity; more performance for mission-critical applications; more recognition for manageability as an issue; and more talk, with few specifics, about multimedia.

What's missing is a unifying strategy, an organizing principle for all of the technological developments in PC networking, ensuring that the four major challenges are being met not just on paper, but with real products that resolve thorny networking issues in the real world.

Hewlett-Packard provides that unifying strategy by helping network managers meet the four challenges of managing complexity, improving performance, reducing cost, and enabling multimedia *while satisfying today's imperative to extend and evolve existing networks.* This recognition—that all improvements have to occur in the context of a company's existing investment in strategic networking systems—is a key element of HP's strategic vision, one that is shared by HP authorized value-added resellers.

The following articles describe some of the newest and most promising developments in PC networking: a new stackable architecture that offers users new flexible, distributable performance; 100VG-AnyLAN, which will provide a tenfold improvement in performance of either Ethernet or Token Ring networks without costly software or wiring changes; a new standard for multiprocessing that will help users of servers and PCs more easily reap the benefits of this high-performance technology.

Even as isolated innovations, these are exciting. But they are more compelling as examples of a unified vision. They illustrate HP's determination that networks be easy to extend to meet new demands for performance and capacity, and that they conform to relevant industry standards. They highlight HP's goal that networks be easy to evolve to meet constantly changing needs. And they confirm HP's strategy to embrace today's imperative. ●

Richard C. Watts

Richard C. Watts
Vice President and General Manager
Personal Information Products Group
Hewlett-Packard

Servers Catch the PCI Bus

PCI's bandwidth and throughput capabilities—together with its processor-independence, extensibility, and compatibility with other buses—will soon make it a common bus architecture for PC servers

Driven by the requirements of compute-intensive applications and higher server performance, a new local bus architecture is entering the commercial mainstream. Called the Peripheral Component Interconnect (PCI), this new architecture remedies the shortcomings of other buses in today's computing environment, where advances in hardware performance are almost immediately consumed by the demands of ever more complex applications. PCI's bandwidth and throughput capabilities, together with its processor-independence, extensibility, and compatibility with other buses will soon make it a common bus architecture for PC servers.

THE ADVANTAGES OF PCI

PCI was developed by Intel Corp. to fill two roles. On the desktop, it is a processor-independent bridge between high-speed peripherals and the CPU. In servers, it is used to accommodate traffic between these peripherals and main memory. Although Intel originated PCI, the company does not control it. In 1992, a group of companies formed a special interest group to manage the specification.

PCI brings four advantages to today's computing environment.

The first is performance. It is 32 bits wide, which yields a peak bandwidth of 133 megabytes per second (MBps) when running at 33 MHz.

The second is compatibility. PCI works with ISA, EISA, and MCA buses. Initially, PCI machines will have a combination of buses due to the natural dynamics of a market in transition. But there will always be a need for lower-performance buses to handle tasks where PCI's performance would be wasted (e.g., modems and parallel and serial ports), so compatibility will be an ongoing requirement.

The third is processor independence. The PCI specification has an intermediate buffer between the CPU and peripherals designed to isolate changes in processor technology from bus design so 486, Pentium™, PowerPC™, and other CISC and RISC processors will all work with PCI.

Which yields the fourth major advantage: PCI has several characteristics that allow it to provide performance benefits even in the face of significant future changes. Processor independence decouples bus and processor design. Extensibility lets PCI support a multiplexed 64-bit data and address bus, a requirement for the next generation of high-performance peripherals. This extension of its existing 32-bit data and address bus doubles the system's peak bandwidth to 264 MBps. Transparency, provided by a connector that accepts 32-bit and 64-bit cards, insulates the user from the details of communications between 32-bit and 64-bit peripherals. And auto-configuration lets users install PCI boards without having to manually configure jumpers, DIP switches, or interrupts.

New Solutions for Remote Server Management

Ever since companies began to rely on local area networks, LANs and servers have relied on each other to work well. Remote server management has therefore joined network management as a crucial capability for most companies. The two major advantages of remote management are maximized uptime and reduced cost. To achieve the same uptime with 24-hour local server management—the only other practical alternative—is expensive. "Lights out" server management—on-site management during business hours, and support from a remote operations center the rest of the day—is cost-effective and allows companies to consolidate their support staffs in one location, which enables additional savings.

IS executives today require the same kind of sophisticated remote management capability for PC servers that HP has spent decades developing for its large-scale systems. They want server management products that integrate seamlessly with enterprise management solutions. And above all, they want products to help them recover from serious server failure.

HP NetServer Assistant and HP Remote Assistant meet these demands. HP NetServer Assistant is software designed to give users the tools necessary to remotely manage the server in every situation except if the server is no longer running MS-DOS®. If the server has failed, but is running DOS, then HP NetServer Assistant can be used to notify administrators, allow them to dial in and remotely diagnose the problem, and recover operation of the server. HP Remote Assistant can be used in all failure modes. It is a battery-powered card that will either restart the server automatically or allow the administrator to dial in and recover server operation, even if the network is down.

Together, these two products bring large-system management capability to PC servers for the first time. They integrate with all three major management platforms. And they give system administrators a tool to restore operations even when both the network operating system and the server have gone seriously wrong. ●

PCI IN THE SERVER

In servers, PCI offers the paramount advantage of high performance.

Because PCI provides low-latency, high-bandwidth paths for access to PCI devices and main memory, it can support the kind of data transfer necessary for today's applications. A PCI server provides high-performance connections to 1) high-speed networking systems such as 100VG-AnyLAN and ATM, and 2) high-bandwidth, multi-channel disk array controllers.

Designers using PCI can integrate the functionality of multiple LAN connections onto one physical card

While EISA will continue to be a player in the server arena because of better driver and peripheral support, PCI offers some significant advantages. One of these is cost-efficiency. EISA has separate data and address pins, while PCI uses the same pins for both, thus reducing the overall size and cost of the IC package. And designers using PCI can integrate the functionality of multiple LAN connections onto one physical card. This gives users the benefit of using only one system connection to obtain multiple connections to the network.

HP has already implemented PCI on its HP NetServer LF and the new HP NetServer LC. Other PCI servers will follow according to customer requirements.

OPTIMUM

Hewlett-Packard's strategy with PCI is to give users the optimum combination of price and performance in servers. And it can also include cost-effective access to standard peripherals, giving users a cost-effective solution overall, with high-performance PCI bandwidth where they need it most. ●

For data sheets on the HP NetServer LF, the HP NetServer LC, and a whitepaper on PCI, call 1-800-296-5810, ext. 200, or check PCI on the business reply card.

Standardization Comes to Multiprocessing

Technical obstacles have received a lot of the blame for slowing the quest for an affordable multiprocessing server. Cache coherency, bus contention, scalability, and a host of other thorny problems have all challenged system designers. But another challenge, one with both technical and political elements, must also be met before multiprocessing enters the mainstream: standardization.

Until now, the multiprocessing market has been a market without standards, where every vendor implementation was different from every other. There is no common method for the operating system to communicate with the multiprocessing hardware. The net result is terrible inefficiencies for hardware and software vendors, high costs for users, and a situation where the dream of a multivendor multiprocessing environment was impossible to realize.

THE MULTIPROCESSING SPECIFICATION

Today a group of vendors, including Hewlett-Packard and Intel, are spearheading an effort to create a de facto standard for multiprocessing called the multiprocessing specification (MP Spec) Version 1.1. Hewlett-Packard is one of the first vendors in the industry that has systems (the HP NetServer LM2 and the HP Vectra XU PC) supporting this new standard for multiprocessing systems designs based on Intel processors.

The benefits of the MP Spec standard are analogous to the benefit of the uniprocessor standard for both applications and operating systems. Just as the PC specification does in the PC market, the MP Spec will let software developers write multiprocessing applications to a uniform standard. And, again as in the uniprocessor market, the MP Spec will let users buy shrink-wrapped multiprocessing operating systems and run them out of the box. (Users will also be able to run all existing uniprocessing applications on their MP systems unchanged.) As a result, users will be able to reap the benefits of powerful multiprocessing engines without having to worry, as they do today, about the myriad pitfalls of system configuration, performance, optimization, and interoperation.

Every vendor implementation was different from every other

Vendors are expected to embrace MP Spec because Intel is providing MP-ready components, which will make the development of cost-effective systems much quicker. A good example is APIC, Intel's Advanced Programmable Interrupt Controller. A major component of the MP Spec that handles I/O interrupts for multiprocessing, APIC is built into Intel Pentium™ 90 MHz and 100 MHz processors. MP Spec will also let operating system vendors quickly support a wide range of platforms with one MP OS product and one standard OS driver.

Hewlett-Packard is among the leaders in implementing the MP Spec. The HP NetServer 5/66 LM2 is a symmetric multiprocessing server that runs SCO MPX, Windows NTAS, and IBM OS/2® SMP.

MULTIPROCESSING GETS REAL

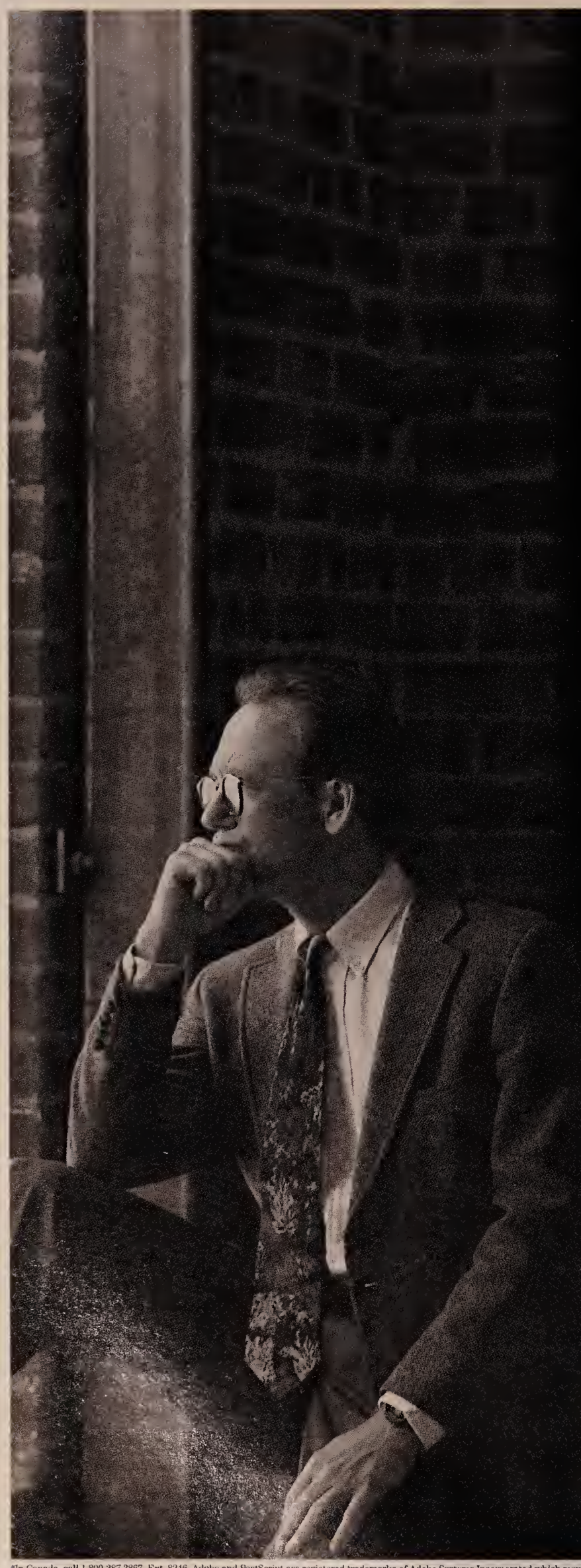
For multiprocessing to be a viable mainstream strategy requires three preconditions. There must be multiprocessing hardware, which already exists: HP's NetServer LM2, a multiprocessing application server, and the HP Vectra XU PC, a high-performance technical and business personal computer, are good examples. There must be multiprocessing applications written from the ground up to incorporate "multithreading," the ability to break up a given problem into many fragments, called "threads," and process them in parallel. Few multiprocessing applications yet exist. And there must be multiprocessing operating systems.

Here the picture is less black-and-white. The crucial characteristic is whether and how well operating systems support multithreading, which sometimes defies unambiguous pronouncements. Windows NTAS SMP, SCO MPX, IBM OS/2® SMP, and the proposed Novell NetWare™ MP, are all "fairly strong" in multithreading, but in ways that may or may not be quite different from each other—that are not standardized.

BENEFITS OF STANDARDIZATION

This is one of the areas in which the MP Spec will have a tremendous positive impact. Standardization will make the evaluation of the multiprocessing and multithreading capabilities of different applications and operating systems much simpler. It will allow every group with an interest in multiprocessing systems to benefit from lower costs and increased interoperability. And it will free vendor resources to concentrate on much higher levels of functionality and performance. ●

For data sheets on the HP NetServer LM2 and the HP Vectra XU PC, call 1-800-296-5810, ext. 200, or check MP Spec on the business reply card.



Made to be ignored.

Network-ready HP LaserJet printers for your LAN.

Much to be done. And precious little time to do it. Why allow network and end-user snags to distract you from the more important things?

The new, network-ready HP LaserJet 4M Plus and the HP LaserJet 4Si MX printers work in all the most popular network environments. Direct-connect right out of the box with the built-in HP JetDirect network interface card. And move between network operating systems without firmware upgrades.

The primary benefit to users is, of course, faster job completion time. Network-ready HP LaserJet printers bypass parallel-port bottlenecks. Maximize data-transfer speed. Provide bi-directional communication. And reduce the load on your file servers.

Other user benefits abound. Automatic switching between languages, I/Os and operating systems. Adobe™ PostScript™ Level 2 software built in. And versatile paper-handling capabilities.

Consider all this, along with legendary LaserJet reliability and HP's superior service and support, and there's really no question. Call 1-800-LASERJET, Ext. 8246 for more information.*

Give your users network-ready HP LaserJet printers. Let them take care of themselves. Then walk away with confidence.

You do your job. We'll do ours.

HP LaserJet Printers

HEWLETT® PACKARD

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Freedom of the (Networked Printing) Press

In 1920, A. J. Liebling wrote that "Freedom of the press belongs to those who own one." If he were alive today, he might have added: "And not necessarily to those who have to use one over a network."

This may be true for many kinds of networked printing. But Hewlett-Packard has developed a strategy to make the clearcut goals of reliability, flexibility of location, performance, interoperability, and manageability simple to achieve in heterogeneous networked environments: to make network printing as easy and productive as local printing.

A SUCCESSFUL NETWORK PRINTING STRATEGY

The fundamental building blocks of a successful network printing strategy are reliability and location flexibility. If network printers are not reliable, and if they cannot be placed near the people who use them most, then all the other benefits are superfluous. HP has built its network printing reputation on LaserJet and DeskJet printers that deliver solid, excellent performance over and over again. And the company has made it possible for network managers to place these reliable printers wherever they're needed: either connected through systems, or directly to the network using the HP JetDirect family of print servers.

One step up from these foundation elements for network printing are the requirements for performance, interoperability, usability, and manageability.

HP addresses the performance issue by making it possible to connect printers directly to networks, thereby ensuring that printing occurs at network speed. HP printers, which are typically shared, have a modular I/O (MIO) expansion slot that accommodates JetDirect internal print servers for different operating systems. Having shared the MIO specification with its strategic partners, HP now has solutions for more than 95 percent of the network environments in use today.

Interoperability—the ability to print from anywhere to anywhere without regard for cable types, language, or NOS—is becoming a necessity in today's heterogeneous installations. In addition to the fact that HP's printers are network-ready printers and may have multiple interface cards, they have a number of automated features for interoperability. Automatic I/O, language, and network switching lets printers switch among I/O ports, page-description languages, and protocols/NOSs without user intervention.

For enhanced usability, HP has provided built-in intelligence and powerful utilities for its printers. Through HP Admin and HP JetPrint printer management utilities, users can get everything from remote configuration and front-panel viewing, to real-time status reports and point-and-click printing to the most convenient printer, to remote diagnostics and trouble-shooting.

These last capabilities are really a part of manageability, an area administrators find increasingly important. Network printing, which was initially developed to save money and effort, can end up costing organizations if it is not easy to manage. A person who sends an important 15-page document to a printer can easily discover the many ways this seemingly straightforward process can become complex:

- Half the document is missing because the printer ran out of paper;
- The document is printed on letterhead from the wrong paper tray;
- The text is faint because toner was low;
- The document is now 100 pages long because the printer did not have the right page-description language.

And so on. When these events occur frequently, network printing does not save money; it becomes a drag on time, user productivity, and support resources. Hewlett-Packard's network printing strategy is designed to develop a set of powerful management tools, based on the Simple Network Management Protocol (SNMP) and the Desktop Management Interface (DMI), to automate the management process as much as possible and reduce the incidence of these problems.

PRINTING PRODUCTIVITY

HP's fostering of seamless compatibility across networks, support of industry-standard management systems, and ability to provide bi-directional communications capability with network printers make management much easier and more effective. When combined with the other elements of HP's network printing strategy, these capabilities can transform a large part of a LAN manager's job. Without HP's network printing capabilities, LAN managers tend to spend a lot of time on crisis management. With these capabilities, they tend to spend more time on making networks—and network printing—much more productive.

HP has developed a strategy that makes network printing as easy and productive as local printing

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For more information on HP's network printing products and strategy, call 1-800-296-5810, ext. 200, or check Network Printing on the business reply card.

Look for us on all the major networks.

Word about PCs from Hewlett-Packard is getting around, and ratings are soaring. According to a recent CRN/Gallup survey, "Use of HP desktops in Fortune 1000 companies has doubled in the last year."‡

And with good reason. Our broad range of PCs not only meets users' expectations for power and ease of use, it also answers the needs of a network manager. With built-in features like on-board networking, advanced security and asset tracking, HP PCs have what it takes to be top performers on virtually any network. And soon our expertise in network management will reach all the way to the desktop, as we continue to pioneer the development of DMI (Desktop Management Interface).

For more information or the name of your nearest HP dealer, call us today at 1-800-322-HPPC, Ext. 8324. And tune in to the network superstars.

HEWLETT® PACKARD

Give your other PCs something to look up to.

If you're connecting PCs to a network, scan this chart and you'll see it's time to hook up with HP.

STANDARD NETWORKING FEATURES	HP VECTRA M2 PC	COMPAQ DESKPRO/XE	DELL NETPLEX
Advanced Bus Architecture	VL-bus		
Integrated Networking Interface	16-bit		
Integrated, multiprotocal Boot-ROM	X		
ISA Plug-n-Play Compliant	X	X	
Multilevel Security Features	X	X	X
Asset tracking	X	X	
PC tattooing	X	X	
Optional Desktop Management Software	X		
Bi-directional parallel port	X	X	X
Desktop Management Interface (DMI)[3]	X		

HP quality in value-priced PCs.

- *Intel 486SX, 486DX2 and DX4*
- *Chip upgrades to higher performance*
- *On-board accelerated local-bus video*
- *210-MB hard drive*[1]
- *4-MB RAM, expandable to 64-MB*
- *512-KB or 1-MB of Video RAM standard*
- *ISA Plug-n-Play compliant*
- *Desktop Power Management*

HP Vectra VL2

- *EPA Energy Star certified*
- *Local bus Fast-IDE hard disk interface**
- *1280 x 1024 video resolution**
- *Optional 128- or 256-KB cache memory**
- *Free three-year limited warranty for parts and labor*[2]

from
$1,099†

High-performance network-ready PCs in a slimline package.

- *Intel 25- and 33-MHz 486SX, 50- and 66-MHz 486DX2, upgradable to Pentium Overdrive*
- *Optional 128- or 256-KB second level cache*
- *170-MB, 14-ms Fast-IDE hard drive*
- *32-bit Fast-IDE local-bus hard disk interface*
- *4- or 8-MB RAM, expandable to 96-MB*
- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*

HP Vectra N2

- *1 MB of video RAM standard, expandable to 2 MB*
- *Slimline package with two mass storage shelves and three ISA slots*
- *Optional integrated 10Base-T networking*
- *Multilevel security*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)*[3]
- *Free three-year limited warranty for parts and labor*[2]

from
$1,309†

High-performance PCs for the connected office

- *Intel 33-MHz 486SX; 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive*
- *Optional 128- or 256-KB second level cache*
- *Four mass storage shelves; four expansion slots*
- *One available 32-bit VL-bus slot*
- *210-MB, 14-ms Fast-IDE hard drive*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*

HP Vectra M2

- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*
- *Optional integrated 10Base-T networking*
- *Systems Diagnostics Utility*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)*[3]
- *Free three-year limited warranty for parts and labor*[2]

from
$1,679†

Top performance for experts in connected environments.

- *Intel 60-MHz Pentium with 256-KB write-back cache*
- *One PCI slot, one shared PCI/ISA slot, two ISA slots*
- *Four mass storage shelves*
- *270-MB Fast-IDE hard drive with 12-ms access time*[1]
- *Integrated S3 928PCI graphics accelerator*
- *2 MB of VRAM expandable to 4 MB, 1600 x 1200 video resolution*
- *8-MB RAM, expandable to 192-MB*

HP Vectra XP

- *Integrated 16-bit 10Base-T networking interface with bus-master DMA*
- *Flash EPROM*
- *Systems Diagnostics Utility*
- *Power-on Self Test*
- *Multilevel security*
- *Asset tracking with non-erasable serial number and customizable PC tattooing*
- *Bi-directional parallel ports*
- *Free three-year limited warranty for parts and labor*[2]

from
$3,559†

intel inside

yes NetWare Tested and Approved

All HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 pre-installed; HP mouse and keyboard included. *Feature included with some models. †List price, dealer prices may vary. Monitor not included. [1]Other capacities available. [2]First year on-site, 24-hour service. Second and third year return to dealer. [3]Available 9/1/94. ‡With permission CRN/Benchmark. MS-DOS is a U.S. registered trademark and Windows is a trademark of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. PPG403 ©1994 Hewlett-Packard Company

Remote Component Management Through DMI

After evolving on paper for years, the Desktop Management Interface (DMI) specification is now taking tangible form in a line of high-performance PCs. Hewlett-Packard is developing three new HP Vectra models—the M2, N2, and XU—to be DMI-compliant. These PCs represent the first, and broadest, product line to conform to the new specification.

A THREE-PART ARCHITECTURE

DMI is a set of APIs and related code that has been developed to create a common set of rules for managing PCs across a network. The particular benefit brought by DMI, and the reason behind the excitement concerning its development, is that the specification holds the promise of allowing remote systems management down to the level of individual components.

Any code for component-level systems management in the PC market must enable management information from an enormous range of components to be used by management applications that cannot possibly be tailored to each of those components' idiosyncracies. DMI meets this challenge with a three-part architecture that enables three key functions. It has a common set of APIs, so that third parties can write management applications to a common interface, not a bewildering array of components. It provides a uniform component interface, so that component manufacturers can provide management information in a completely standard format, and not have to worry about which management applications are most popular and what their requirements might be. And it has a service layer in between these two to coordinate and manage the traffic between applications and components.

DMI was developed by a consortium of eight companies (Hewlett-Packard, Digital, IBM, Intel, Microsoft, Novell, SunConnect, and SynOptics) called the Desktop Management Task Force, or DMTF. Hewlett-Packard became a charter member of DMTF and supports DMI for two reasons. First, the industry absolutely requires some kind of standardized specification for component-level management. And second, the specification for DMI is completely open, is easy to implement, and does not require approval by any standards-making body. As a result, the barrier for entry, and for successful innovation, is low.

DMI can be implemented in several kinds of products: components like network interface cards, mass storage devices, printers, faxmodems, and video cards; applications such as spreadsheets, databases, and network management applications; and can work with the Simple Network Management Protocol (SNMP) and Common Management Over LCC (CMOL). In the future, DMI could easily be incorporated into all network operating system

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Improving Performance with Integrated 32-Bit Networking

One strategy for enhancing network throughput essentially ignores the network side of the equation, and instead focuses on system internals. After all, looking at the communications process as a whole, if data gets *to* the network faster, it will go *through* the network faster as well.

Hewlett-Packard is among the first companies to implement this strategy in the PC market. By integrating a 32-bit Ethernet controller for the Peripheral Component Interconnect (PCI) bus onto the motherboards of its HP Vectra XU PCs, HP has given PC users a jump in performance on both sides of the networking interface.

COMPETITIVE ADVANTAGES

The main reason for integrating 32-bit networking onto the motherboard is simplicity. Integration solves a number of compatibility problems, as well as obviating the entire issue of configuration; integrated 32-bit networking is completely preconfigured and ready to run.

The main reason for using PCI is, of course, performance. But that's not the only reason. PCI also offers compatibility, processor independence, and the ability to be "future-proof"—significant benefits in today's networking environments.

The performance advantage is impressive. With its 32-bit-wide architecture running at 33 MHz, a PCI bus yields a peak bandwidth of 133 megabytes per second. At 10BaseT line speeds, that gives users an approximate jump of 10 percent in network performance for no additional network investment. But the HP Vectra XU PC will have PCI slots that allow users to add 100VG-AnyLAN PCI cards. At 100 megabits per second (Mbps), bus bandwidth is a significant limiting factor in overall network throughput, and a PCI bus offers a tremendous competitive edge. Users can expect a 1000% network throughput improvement with a 32-bit PCI 100VG-AnyLAN card versus a 10BaseT Ethernet card.

Integrated 32-bit Ethernet/PCI on the motherboard also provides a compatibility advantage. PCI is unique in the local bus arena in that it works with existing ISA and EISA buses, thus helping IS managers gain a powerful performance increment, but still preserving their investment in these older bus technologies.

Added to this "bus independence" is processor independence. The PCI specification provides an intermediate buffer between the processor and the peripherals. This effectively decouples changes in processor design from the local bus specification, providing more flexibility and another means of investment preservation.

Finally, PCI is relatively impervious to future technological change. Future processor designs will run over PCI. The multiplexed 64-bit data and address bus required by the next generation of peripherals will be

continued on page 17

Thanks to the power of the new network, the Indians have been able to take the $40 million concessions business back from contractors and bring it into their own organization

The Cleveland Indians Build a Digital Data Warpath

To look at the salary structure of a major league baseball team is to enter a world that makes cost-accountants cry. Imagine running a company where the average salary of your employees is hovering around $1.1 million a year, and you begin to get the picture. If money talks, baseball is one of the loudest businesses on earth.

On the field. But in the front office, where the nitty-gritty support functions of the National Pastime happen, it's a different story. Here the pressure to cut costs is ferocious, and baseball business people face a dilemma. How can they manage the enormous amounts of information generated during a six-month season without spending enormous amounts of money to do it?

MORE CONNECTIONS, FEWER STAFF

The Cleveland Indians resolved that dilemma with a low-cost, high-performance network from Hewlett-Packard. When the city decided a few years ago that it was time for a new ballpark, the organization decided it was time to make their front office the most efficient in the major leagues. So they entered into a 12-month evaluation/design process to come up with an information system that would do four things: be a single sitewide data highway, support up to 700 client PCs in four widely dispersed business units, be manageable from one station anywhere on the network, and not incur the cost of a larger IS staff.

"At a bank with that many nodes, the IS staff would probably be between 20 and 30 people," says Michael Zoldan, the Indians' director of information systems. "We don't have that luxury." Zoldan says the Indians' IS staff has five people now. And thanks to the functionality and ease of use of HP systems, it will not have to grow.

During the evaluation/design process, Zoldan and the IS team winnowed all possible vendors down to Hewlett-Packard, IBM, and Compaq based on a single criterion: Would they be a long-term player in the market? From these prospects, they signed Hewlett-Packard "because they were head and shoulders above the others in three areas," Zoldan says. "First, they provided a complete solution that was simply not available from the other two vendors. Second, they had a strong relationship with Novell, and the ability to bring Novell in to help with the NOS whenever necessary. And third, they really took ownership of the entire project. From project meetings, to installation, through to post-installation evaluations, HP had a team of certified engineers here. No other vendor could do that."

HP's willingness to get involved in all aspects of the network project turned out to be crucial. The new stadium was a partnership between the public and private sectors, and was funded in part through the imposition of new taxes on tobacco and alcohol. Any slip up had the potential to bring the wrath of the public (and of tax-averse politicians) right down onto the heads of the Indians' IS department.

"We were under a microscope," Zoldan says. "But HP took it upon themselves to make this network a showcase. They said they wanted to make it the finest solution available, and it is."

What the Indians wanted was a single data superhighway—a digital warpath, if you will—that would use 10BaseT Ethernet running over fiber optic cabling to link up to 700 client PCs in four separate, geographically dispersed business entities. These included a 42,000-seat ballpark in Cleveland, an adjacent four-story office building, two remote sites in other parts of Ohio, and the entire spring training facility in Winter Haven, Florida.

A $40 MILLION BENEFIT

The Indians are one of a new breed of corporation that will run its operations entirely on PC-based systems. Topologically, the network that connects these systems is 28 star subnets, segmented with HP hubs and connected to remote sites with the HP Router RB for wide-area connectivity. Logically, however, it is a single network that connects all desktop PCs, 20 HP NetServer LM servers, and a total disk-farm of 30 gigabytes. The benefits the new network has brought to the organization are staggering.

First, the IS department's staff will stay the same size despite a radical increase in the amount of automation. This is a result of network management utilities from Intel and Novell, the remote manageability and ease of use built into HP equipment, and the power of HP's OpenView network management platform. "We have a tightly integrated network management system," Zoldan says, "which allows us to keep the net running efficiently without increasing staff."

Second, the entire organization's permanent staff is 20 percent smaller than it otherwise would have been because the cash accounting systems—which used to be variations on the "left pocket income, right pocket change" system—have all been automated and networked to the central office.

And third, thanks to the information management power and visibility provided by the network, the Indians have been able to take the concessions business back from contractors and bring it into their own organization.

"That's a $40 million to $50 million business," says Zoldan, with significant profit potential for the ballclub. "And we'll be able to stretch our existing IS staff to cover it easily. With this setup, we can sit at any workstation on the network, even down in Winter Haven, and manage every aspect of the network."

A NETWORK MANAGEMENT WIN

This ability to manage the entire network easily is crucial to the Indians' ability to control costs. The ballclub exists in a complex business information environment characterized by tens of thousands of cash transactions every day of the season—and sophisticated, large-scale financial planning, control, and analysis every day of the year. To win—on the field and off the field—the Indians have to manage this information environment and make it work. And to do that, they depend on Hewlett-Packard.

*Customer must return warranty registration card to HP. Five-year on-site warranty; after five years return hub to HP. Power supply and fan covered by five-year on-site warranty only. †In Canada call 1-800-387-3867, Dept. 190. ††Based on U.S. list price of 4/1/94. ©1994 Hewlett-Packard Company RND008

The HP AdvanceStack features an expansion slot that offers a flexible upgrade path to SNMP, bridging/routing, high-speed backbone connections and more.

Introducing the HP AdvanceStack family of 10Base-T stackable hubs.

If you like the front of our new hubs, wait until you see the back. That's where you'll find their unique expansion slot, and proof of their unprecedented flexibility. Buy the HP AdvanceStack today and you get a low-cost solution for your current setup. Then when you

Stack to the future.

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- Management bus separate from data bus
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- 185-meter hub separation capability
- Hot-swap capabilities
- i960 RISC processor
- MTBF: 274,000 hours (12-port model)
- Starting under $90/port††

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want additional functionality, all you need is a cost-effective expansion module, not a new unit. Add a lifetime warranty* backed by HP's reputation for quality and reliability, and we think you'll want to find out more about AdvanceStack right away. For fast faxed information, call **1-800-964-0714**, or for a full product brochure, **1-800-533-1333, Ext. 8117.**†

And discover why so many people are looking in back of the stack–AdvanceStack, that is.

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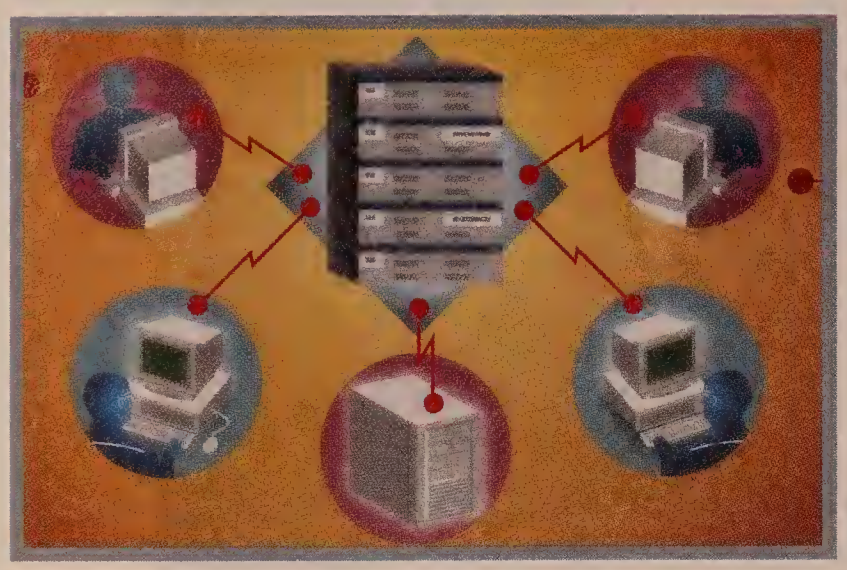

A Stackable Architecture for an Open Network Future

They sound so simple: "Extend" and "Evolve." But these two new networking imperatives demand that network managers resolve a pair of exacting dilemmas. How can an organization extend the productive lives of today's equipment, and still have an architecture that can be evolved to accommodate the demands of future technologies? And how can it do the same things with its network management system? Hewlett-Packard has developed the AdvanceStack architecture and an OpenView-based management system to answer these questions.

Today's computing environment is distributed, full of existing systems, standardized, in need of powerful automated management tools, and is constantly changing to accommodate new technological futures. This is the environment for which the HP AdvanceStack network architecture, with its eight essential principles of distributed network connectivity, was built; it is open, distributed, scalable, predictable, dependable, economical, manageable, and it provides excellent performance. The net result is that that the AdvanceStack architecture allows network managers to satisfy the imperative to not replace existing networks, but to extend and evolve them.

EXTENSION

The distributed computing paradigm has triumphed, with small, powerful systems sitting on desktops and communicating over ever-faster networks. Yet to service these networks, some manufacturers have built large hardware chassis with proprietary cards and fast backplanes that sit in central computer rooms—a kind of network-infrastructure "mainframe." This defeats the goal of distributing communications capability throughout the enterprise, and results in a single point of failure that can knock out large chunks of the network.

Stackable network systems provide an alternative that maps more directly to the distributed nature of today's networks. HP's AdvanceStack network connectivity products—hubs, bridges, and routers—use all of the same topologies and wiring as existing LANs. AdvanceStack hubs can be combined to provide good throughput for large numbers of users. They can seamlessly introduce increased performance into

Making Fast Ethernet Real

The promise of 100VG-AnyLAN, a new Fast Ethernet standard developed by Hewlett-Packard, is compelling: higher performance, integration with current networks, and the ability to handle new video and multimedia applications.

A natural evolution of 10BaseT Ethernet and Token Ring networks that supports their basic frame technology, 100VG-AnyLAN lets organizations extend and evolve their existing networks.

It can deliver 100 megabits per second (Mbps) to every node in a given network with no major software changes. It lets organizations preserve and leverage the overwhelming majority of their investments in Ethernet and Token Ring networks. And its deterministic Demand Priority arbitration system enables video, voice, and multimedia applications, which require guaranteed bandwidth and predictable, low latencies.

With the introduction of four new products—a hub, a 10/100 bridge module, and two adapter cards—Hewlett-Packard has become the first company to make the promise of 100VG-AnyLAN real. In isolation, these products extend the performance of 10BaseT networks. But as part of a product family, they also provide a migration path for the rest of HP's AdvanceStack systems, giving network planners a way to evolve existing systems so that they can include future, high-speed networking technologies.

The HP AdvanceStack 100VG Hub 15 is an intelligent central controller with 15 ports and one additional uplink port that can be used to "cascade" hubs.

The HP 100VG SNMP Bridge Module is a bridge/SNMP management card that allows users to bridge to existing Ethernet networks.

And the HP 10/100VG Selectable ISA/EISA Adapters are cards that support 10BaseT or 100BaseVG operation, giving users and administrators a great deal of flexibility in allocating bandwidth where it is needed most.

Because it accommodates existing equipment and systems so well, 100VG-AnyLAN gives users some powerful advantages. It requires no changes to application software on clients or servers, and is compatible with current NOSs. It requires no changes to bridges and routers, supporting the frames and network management systems already in use. It gives users 100 Mbps performance. It gives administrators a seamless way to boost the performance of 10BaseT by a factor of 10. And it gives organizations a networking system that allows them to realize these higher data rates over existing Category 3, 4, or 5 wiring, thus obviating one of the biggest costs of network upgrades. In short, it gives anyone making network decisions a way to sidestep the old choice between getting higher performance or preserving existing systems. With 100VG-AnyLAN, for the first time, they can do both. ●

For data sheets on HP's 100VG products, call 1-800-296-5810, ext. 200, or check 100VG-AnyLAN on the business reply card.

Want more info? Call 1-800-296-5810, ext. 200

Or, if you prefer, complete the following and we'll send you information directly.

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any place on the network, as it is needed. With their "instant-on" capabilities, AdvanceStack products can be used to easily connect existing LANs. And because they all support major networking standards, they can be introduced into existing networks with no NOS or application software changes. In other words, HP's AdvanceStack products allow network managers to extend existing networks to meet new requirements without having to change the entire network infrastructure.

EVOLUTION

For its ability to evolve to meet constantly changing future needs, the AdvanceStack architecture has no competition. Because of the ability to "stack" multiple units to add incremental performance, the architecture is almost infinitely scalable. It also offers a complete range of price/performance options: 10 Mbps to 100 Mbps shared-bandwidth LANs; 10 and 100 Mbps switched LANs; high-speed async and synchronous remote links; and, in the future, local and remote ATM switching and routing.

Given networks' propensity for growth, this scalability and range are powerful advantages. When coupled with AdvanceStack's standardization, the benefits are even greater. Network managers are being asked to control operations costs, to not shut the door on future video and multimedia applications, and to avoid dead-end expenditures. AdvanceStack's ability to accommodate all major standards obviates these potential pitfalls, enabling managers to evolve the network easily to meet even the most rigorous application requirements.

NETWORK MANAGEMENT

Of course, none of this would be any good if AdvanceStack did not also offer the network management tools that administrators need. To achieve well-managed networked PC hardware in today's distributed environment, management solutions must be integrated and open: integrated so that people can manage disparate networks from a single platform; and open so that they have the ability to add new tools to the management platform as they are developed.

HP's network management is built on the industry-standard OpenView network management platform, with support for MS Windows™, Windows NT, and UNIX®. In addition to hundreds of third-party management applications, HP has a core set of applications built on OpenView that allow network administrators to select a level of management appropriate to their network: basic management, for networks that do not need SNMP management, but do require configuration, monitoring, and troubleshooting; SNMP management for larger, more traffic-intense networks with tools for increased security, network firmware management, and network diagramming; and advanced management based on HP's EASE instrumentation—instruments embedded into AdvanceStack hardware that help optimize network performance, pinpoint trouble spots, and define traffic patterns.

THE BIGGEST POTENTIAL GAINS

Extend and evolve. Both HP's AdvanceStack architecture and its OpenView-based management solutions are designed from the ground up with these in mind. AdvanceStack extends and evolves the actual network infrastructure. And the management solutions help extend the useful lives of past investments while they help users evolve their management capabilities, keeping future options open by adhering to an open architecture that supports all major management standards. Providing cost-efficient, open, and flexible networking in today's environment is a challenge. But given the potential gains in productivity that could result, it is a challenge well worth meeting. ●

For data sheets on the HP AdvanceStack products, call 1-800-296-5810, ext. 200, or check HP AdvanceStack on the business reply card.

Written by David McDougal, a technical writer based in Redwood City, California.
Produced by Reed and Ingle of Saratoga, California.
Designed by Lisa Ferdinandsen of Power Productions of Palo Alto, California.
Illustrations by Nick Fain/Electronic Images, San Francisco.

DMI *continued from page 12*

environments, and many DMTF members—including IBM, Microsoft, and Intel—are either investigating the possibility or planning to incorporate DMI into their offerings.

A TWO-PHASE DMI STRATEGY

Hewlett-Packard has a two-phase strategy in DMI. The first is Remote Management, which ensures that HP systems have the hardware, firmware, and software to take advantage of DMI's ability to remotely manage PCs. The HP Vectra M2, N2, and XU PCs—and future PCs from HP—will implement this first phase. Remote Management includes alert management and automatic alert propagation through various communications media to network managers. HP's particular value-added will be the user's ability to remotely manage the company's trouble-free personal computing (TFPC) features: ease of use, setup, security, for example. This first phase is essentially concerned with either initialization or reacting to negative events.

Active Management is the second phase, which involves remote firmware upgrades, software revision control, group client control, and the ability to send broadcast messages. The second phase allows systems administrators to manage for optimum performance, not just fewer service interruptions.

The reason DMI is important is that it holds such promise for reducing one of the rising costs of networking: the cost of maintenance and administration in an environment where networks are getting bigger and more important with each passing day. With the ability to remotely manage PCs down to the component level, administrators can dramatically reduce the cost of ownership by managing larger networks with smaller numbers of staff.

The addition of DMI to Hewlett-Packard's line of Vectra PCs rounds out the capabilities of a system built for demanding networked computing environments. Remote management enables users and administrators to more fully exploit these systems' fast processors, advanced bus architectures, impressive video capabilities, and integrated 16- and 32-bit networking capabilities. Because with DMI, administrators can manage PC systems for optimum performance, not just acceptable levels of downtime. ●

For data sheets on the DMI-compliant HP Vectra PCs, call 1-800-296-5810, ext. 200, or check DMI on the business reply card.

32-Bit Networking *continued from page 12*

supported by PCI. The details of 32-bit/64-bit translation are transparent to PCI.

Finally, HP's integrated 32-bit networking strategy improves network throughput by exploiting PCI's concurrent processing advantages. The network controller chip contains all of the logic necessary to send and receive data and network requests with an absolute minimum of CPU intervention. The usual two-step buffer memory system is therefore unnecessary, which improves network performance. And the CPU is freed for other tasks, which improves system performance. And if system performance is improved, then data is getting to the network faster; and the network-performance implications of that are clear. ●

For a data sheet on the HP Vectra XU PC and a white paper, call 1-800-296-5810, ext. 200, or check Integrated 32-bit Networking on the business reply card.

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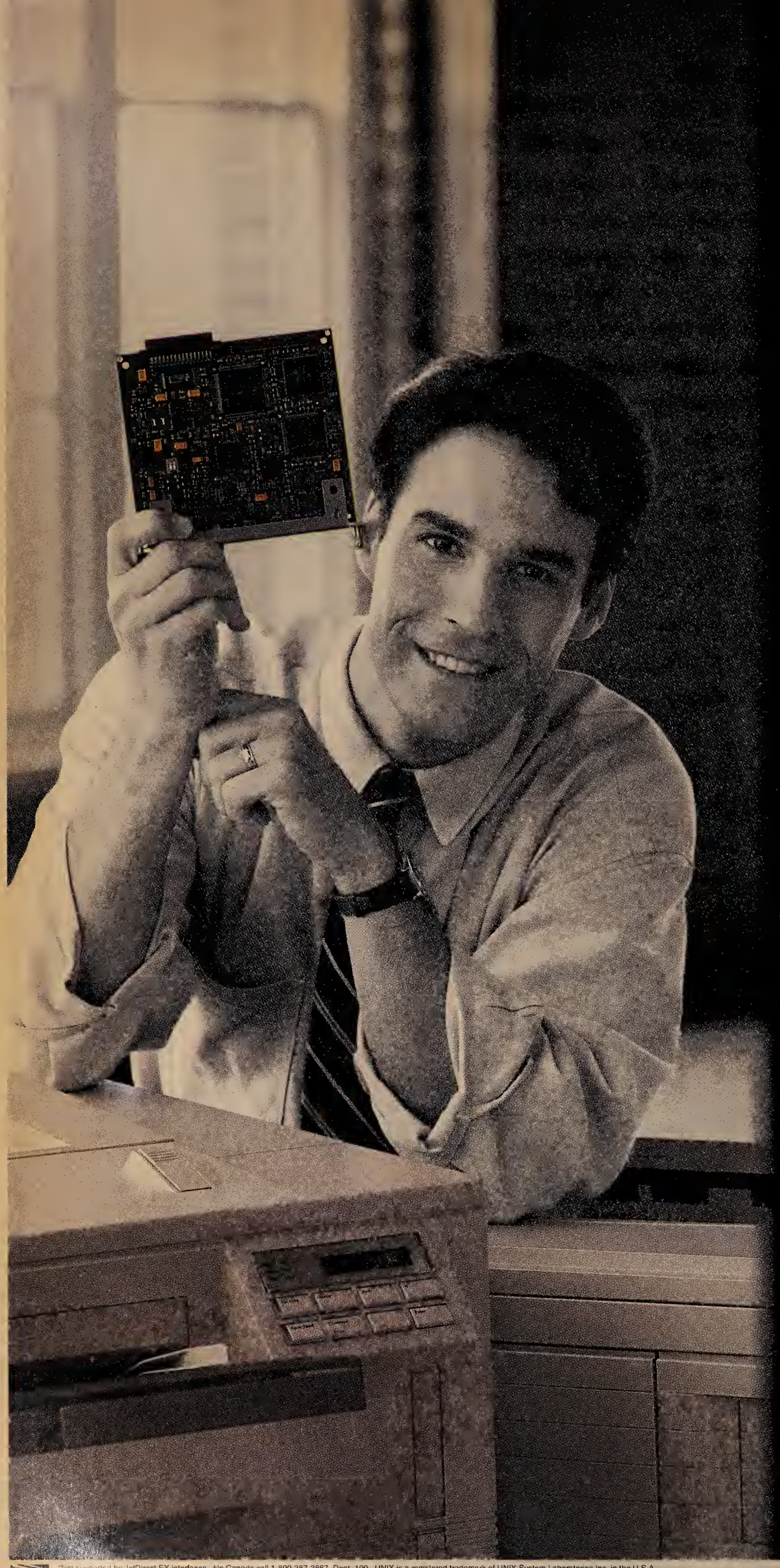

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Another smart networking product from HP.

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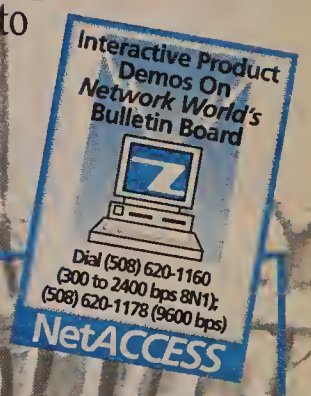

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FAULKNER
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*Circle Reader Service #***39**

Southwestern Bell service gets the lowdown on local callers

BY BILL BURCH

Wichita, Kan.

Southwestern Bell Corp. has introduced a service that gives users detailed reports on incoming calls that can be used to tailor staff requirements, track ad campaigns and otherwise contribute to the corporate bottom line.

The carrier's Caller IntelliData service gives users much of the same data provided by long-distance carriers on inbound 800 calls, such as when incoming calls are made and where they are coming from, said Jim Merin, a Southwestern Bell area manager for product development.

Southwestern Bell's new offering is a critical extension to local calling services, said Daniel Briere, president of TeleChoice, Inc. in Verona, N.J. As many as half of inbound calls are local, and until now, businesses have been in the dark on those calls, he said. Among other Bell companies, NYNEX Corp., Pacific Telesis Group and US WEST, Inc. do not offer the service; Bell Atlantic Corp. can assemble it on a custom basis.

Caller IntelliData breaks down the data

Incoming call report services	Price per month
Total calls	$5
Calls by date	$10
Calls by hour	$10
Calls by area code and exchange	$10
Calls by zip code	$15
Calls by demographic code	$25
All six reports	$45
Installation	$10

With Caller IntelliData, Southwestern Bell provides simple call profile information every month, such as the total number of calls received and the number of calls by date, hour, area code and exchange.

Also, the service features a pair of more advanced services. Calls by zip code + 4 provides call totals by postal code, locating callers geographically down to the half-block. However, the zip code data is only available for calls made from within Southwestern Bell's region.

The carrier is teaming up with Equifax National Decision Systems, a marketing firm in San Diego, to provide call totals by demographic codes. With that service, callers can be grouped by age and income. For example, a customer could find the number of calls from Equifax's "upper crust" demographic group of predominantly urban residents with an average age of 40 to 64 years and a median income three times the national average.

Call totals by month, date and hour are available for all calls. However, area code and exchange, zip code, and demographic code totals all rely on carriers delivering calling party information to the terminating central office, just as for caller identification services.

Although local calls can almost always be classified for all reports, long-distance carriers do not routinely relay calling party information, so information on long-distance callers is currently limited to totals by month, date and number. That limitation will disappear next April, when long-distance carriers will be required to provide calling-party information on all calls.

Caller IntelliData is meant for businesses that advertise telephone numbers in the retail market, Southwestern Bell's Merin said. The carrier plans a cautious rollout, with service only available here, at the start. Additional sites are planned but cannot be named until the business plan is approved in mid-August, Merin said.

Southwestern Bell's new service sounds good to Daniel Gonos, telecommunications manager for Domino's Pizza, Inc. "If I can get a snapshot of my network on an hour-by-hour basis, I can know how many people I have to have in a store in a given time," he said.

The service could also provide useful data for planning advertising campaigns and extending store hours, Gonos said. One enhancement he would like to see is separate tallies kept of busy/no answer calls, a feature it will not have for a few years.

Southwestern Bell's Caller IntelliData is part of a new wave of services built on carriers' Advanced Intelligent Network service platforms. Among other carriers, Bell Atlantic has been working with third-party developers to put together custom AIN applications.

Applications due out before the end of the year include integration of network and Integrated Services Digital Network services from Teloquent Communications Corp. and screen-based telephony from Novell, Inc., according to John Young, Bell Atlantic's acting vice president of research and development.

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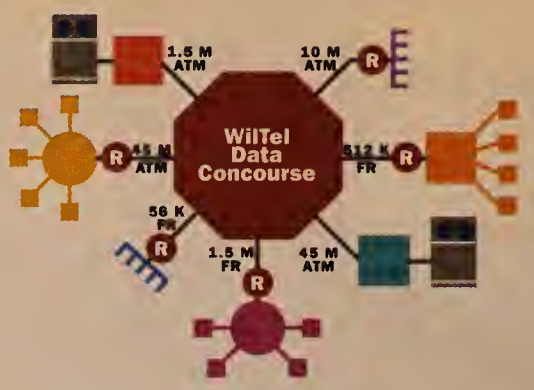

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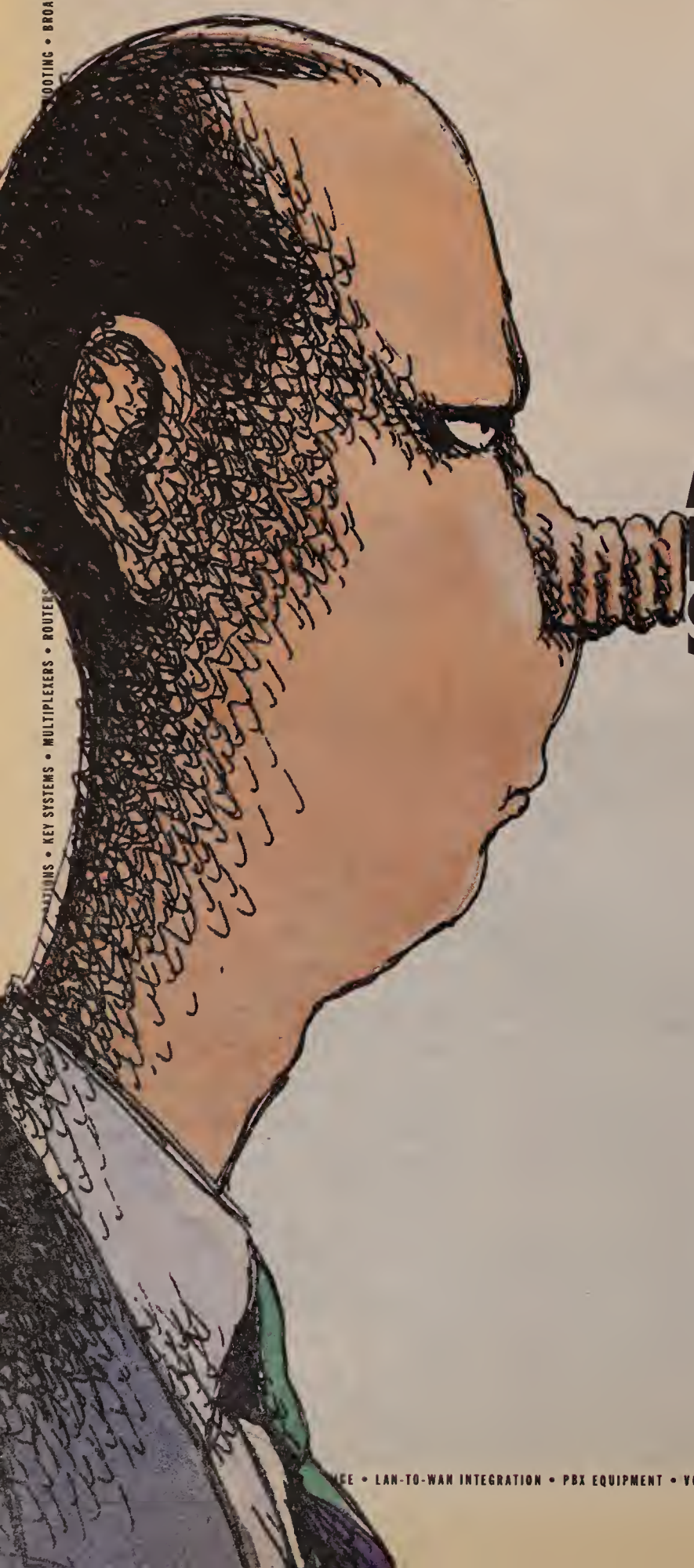

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*Circle Reader Service #**31***

Fourth-generation tools just keep on coming

	Features	Price	Availability
Inference's ArtEnterprise	Has AI-based rules and access to nonrelational data.	$7,995 per license	Now
Ross Systems' Gembase	Is server-based and has application partitioning.	Not available	Now, with enhancements in 3Q and 4Q
Synon's Obsydian	Is AS/400-based, and supports HP-UX and AIX applications.	$17,500 for 2 users	September

New, enhanced 4GL offerings continue to enter market

BY ADAM GAFFIN

The cavalcade of fourth-generation language tools continued last week as several more vendors, including Inference Corp. and Ross Systems, Inc., announced software for building distributed applications.

The application development tool kit market has become increasingly crowded — and complex — for would-be buyers, said Chet Geschecktер, vice president of research at the Hurwitz Consulting Group, Inc. in Watertown, Mass.

Users have to carefully evaluate each tool to decide whether it is really powerful enough for their specific needs, he said.

POWER TOOLS

Inference's new ArtEnterprise for Windows software is one such powerful tool, Geschecktер said.

The new software uses rules-based artificial intelligence to allow developers on Windows workstations to build sophisticated applications with minimum work.

"It would take pages and pages" of Powersoft Corp.'s PowerBuilder or Microsoft Corp.'s Visual Basic scripting to replicate the object-based rules in ArtEnterprise for Windows, Geschecktер said.

Users can employ the tool to build applications for both relational databases and nonrelational data forms, such as documents stored on file servers.

The software currently supports databases from IBM (mainframe and OS/2 versions of DB2), Microsoft, Oracle Corp. and Sybase, Inc. It also supports access to other databases via Q+E Software, Inc.'s libraries.

The El Segundo, Calif., firm's software comes with ArtScript, its own Smalltalk-like high-level development language. Objects created with ArtScript can be integrated with C++ and Smalltalk applications.

ADDING ENHANCEMENTS

Ross Systems, Inc. of Redwood City, Calif., meanwhile, said it will add a series of enhancements to its Gembase fourth-generation tool kit in coming months.

The software, available for Digital Equipment Corp.'s OpenVMS and OSF/1, IBM's AIX and Hewlett-Packard Co.'s HP-UX servers, lets developers build applications that link back-end servers and databases with Windows, Unix and VT clients.

By this fall, the company expects to add support for Microsoft's Dynamic Data Exchange for Windows as well as for Oracle databases on HP-UX and AIX systems.

By January, the company will add an enhanced set of tools for designing Windows user interfaces, as well as support for Microsoft's Object Linking and Embedding and Sybase databases.

The server-based software already lets developers partition applications between clients and servers, as well as build DOS, Windows and Unix interfaces from a single run-time application.

Meanwhile, Synon Corp. of Larkspur, Calif., recently announced a client/server tool kit called Obsydian. Based on IBM's Application System/400, the software will let developers build applications for Windows users to access data on AIX and HP-UX servers, as well as DB2/400 and Oracle databases.

The tool kit is expected to ship in September.

✆Inference: (800) 336-9923; Ross Systems: (415) 593-2500; Synon: (415) 461-5000.

AFIC offers database replication alternative

BY BARB COLE

New York

While the database industry giants try to woo customers with their proprietary replication technology, a little known firm here is aiming to win users' hearts by providing reliable, database-independent replication.

AFIC Technologies, Inc. has announced plans to extend its Multi-Server Option (MSO) database replication system to support Oracle Corp. databases by the first quarter of 1995. MSO, which already works with Sybase, Inc.'s SQL Server database, will also be enhanced to support other databases going forward.

AFIC will also look to make its software stand apart by focusing on reliability. MSO ensures distributed database uptime by requiring net administrators to post a copy of the replication log on an alternate server — a server that is immediately available in the event of a system crash.

REPLICATION IS KEY

Replication is a key technology in distributing databases across networks, generally involving the copying of data to specified servers at predetermined intervals. The technology has become a check-off item for buying databases.

MSO replicates data at the SQL level, which means it copies SQL statements across a net, according to Albert Cahana, president of AFIC. This method of replication makes efficient use of net bandwidth, he said.

"Say you issue a SQL transaction that is made up of 30 characters, but changes 10,000 rows in a table. We broadcast those 30 characters across the net, while the competition moves those 10,000 rows," he said.

MSO consists of a master server, an alternate master server, a master broadcaster (MBC), an alternate MBC, local servers as well as X/Motif-based administrative software for configuring the replication parameters.

The master server is where the primary database is kept, with the alternate master server acting as a backup in case there is a problem with the master server. Local servers store copies of the database at convenient sites across a network.

Master and local servers run on Unix systems from Hewlett-Packard Co., IBM and Sun Microsystems, Inc.

The MBC is software that resides on the master server, and the alternate MBC resides on the alternate master server. The MBC uses a proprietary protocol based on Transmission Control Protocol/Internet Protocol to communicate with the local servers.

THE PROCESS

The replication process starts when a local server receives a database update via a SQL statement. The local server handles the request and forwards the SQL statement to the master server, which updates itself and replicates the SQL statement to local servers across the net so they can be updated. (If end users only want to read data, they may connect directly to the master database.)

MSO will enable users to replicate data across different databases natively when it adds Oracle support next year. MSO will support the various SQL language extensions of each database to enable this, Cahana said.

See **Replicate**, *page 40*

Reality Check

Product: Multi-Server Option (MSO)
Company: AFIC Technologies, Inc.

The benefits:
- Allows for a backup master database to be assigned.
- Works with Sybase's DBMS; will work with Oracle's next year.
- Can be installed in about 2 hours.

The drawbacks:
- GUI-based administration tool is available only for X/Motif.
- Sending updates through master server may cause bottlenecks.

The user view:
"MSO is really good for replicating entire databases. When replicating transactions, a little more planning is involved."

John Webb, manager of database administration, Moody's Investment Services, Inc.

BRIEFS

It's only a matter of time, says the **Object Management Group (OMG).** No way, says **Microsoft Corp.**

Chris Stone, executive director of Framingham, Mass.-based OMG, said the industry consortium and Microsoft are fairly close to agreement on ways to link the OMG's Common Object Request Broker Architecture (CORBA) for **distributed object computing** with Microsoft's Object Linking and Embedding (OLE) technology.

But David Seres, in charge of marketing for OLE at Microsoft, denied this. The company remains intent on marketing its non-CORBA Distributed OLE next year and said that its CORBA link will come through an agreement with Digital Equipment Corp. to link OLE with Digital's own CORBA-compliant ObjectBroker. Seres said Microsoft would reconsider its decision not to offer native CORBA support, however, if CORBA shows signs of winning market acceptance.

Client/server application vendor **The Dun & Bradstreet Corp.** last week said it will acquire **Pilot Software, Inc.,** a vendor of executive information systems software, for an undisclosed sum. Cambridge, Mass.-based Pilot, which had revenues of $37 million last year, makes on-line analytic processing software that lets users drill down through large amounts of data from multiple sources. Pilot will become an independent business unit within D&B.

Compaq Computer Corp. and **Oracle Corp.** last week announced the formation of the Compaq Business Unit at Oracle, a business group that will focus on optimizing the Oracle database to run on Compaq hardware.

Application development tool vendor **Cognos, Inc.** announced Client/Server Ready, a set of products and services designed to help users **migrate to client/server systems.** Client/Server Ready includes a two-day training program, the company's PowerHouse 4GL development tool, PowerPlay and Impromptu end-user query tools, and Axiant Developer's Workbench.

Cognos: (617) 229-6600.

Persistence Software, Inc. of San Mateo, Calif., last week announced a Windows version of its **object-oriented development** tool kit. The new version of Persistence, which will let developers build C++ applications linking Windows clients to back-end databases, is expected to ship in November. Objects built with the Unix version of the software can be recompiled to work with Windows. Pricing was not announced.

Persistence: (415) 341-7733.

IBM middleware beefs up workflow, replication

BY KEVIN FOGARTY

IBM's FlowMark enterprise-level workflow application is a powerful tool, but it would be more powerful if users added a layer of message-oriented middleware underneath, according to analysts.

FlowMark was delivered with a built-in link to IBM's powerful MQSeries message-oriented middleware. Customers can use MQSeries to launch from within FlowMark workflow models operations on databases, or other applications on remote mainframes or servers in the enterprise.

Linking the products would give users a system that could not only route work to end users, but also pass requests for information, like database queries, to applications running on other platforms, according to John Mann, a senior analyst at The Yankee Group in Boston.

Message-oriented middleware behaves like electronic mail on steroids. It is still basically a messaging engine, but it delivers messages among applications rather than among users.

Besides queries, those messages could be CICS transactions or contain data, meaning MQSeries could be used to copy data across an enterprise, Mann said.

IBM is working on ways to integrate MQSeries with data replication tools such as its DataPropagator tool for the DB2 product family, but it will not announce specific products or services until later this year, according to an IBM spokesman.

IBM's MQSeries includes an application program interface to let third-party and corporate developers connect their applications to MQSeries, which handles protocol translation and data transfer via Transmission Control Protocol/Internet Protocol and Systems Network Architecture.

Messages from a Unix application, for example, can be sent to a queue on an MVS-based host and stored until an MVS application picks them up. The message could be a database query. When the request is completed, the mainframe sends the answer in a message to the MQSeries queue on the Unix server, where it is picked up by a Unix application.

Message-oriented middleware behaves like E-mail on steroids. It is still basically a messaging engine, but it delivers messages among applications rather than among users.

In FlowMark's case, once that message is returned, it could be fitted into the workflow model and then sent to a staff member as data, or an image, to be routed through the enterprise.

AUTOMATING WITH FLOWMARK?

The Chicago Mercantile Exchange, which bought MQSeries to speed its trading-floor transactions processing, is considering adding FlowMark to automate many of the recording and verification of the deals its traders register, said Steve Goldman, manager of technical planning at the futures exchange.

The buy/sell notices the Exchange processes follow complex paths that would be made faster and easier with a FlowMark front end and an MQSeries message transfer.

Running FlowMark with MQSeries would yield a robust workflow model with a solid messaging backbone that has complex security code, Mann said.

Replicate

Continued from page 39

Industry analysts described MSO as reliable, but cautioned that AFIC's technology presents net managers with some challenges.

"AFIC's approach is to pump all transaction activity through master servers and let those servers figure out whether it needs to be replicated. This creates the potential for a bottleneck if the master server isn't at your site," said Bobby Cameron, senior analyst in the software strategies service at Forrester Research, Inc. in Cambridge, Mass.

He said MSO stands out with its ability to reconnect applications to a working server in the event of a crash. Sybase's Replication Server, on the other hand, stores transactions until a failed server comes back on-line, causing a delay in update time, he said.

MSO costs between $10,000 and $37,000 per server.

✆AFIC: (212) 406-2503.

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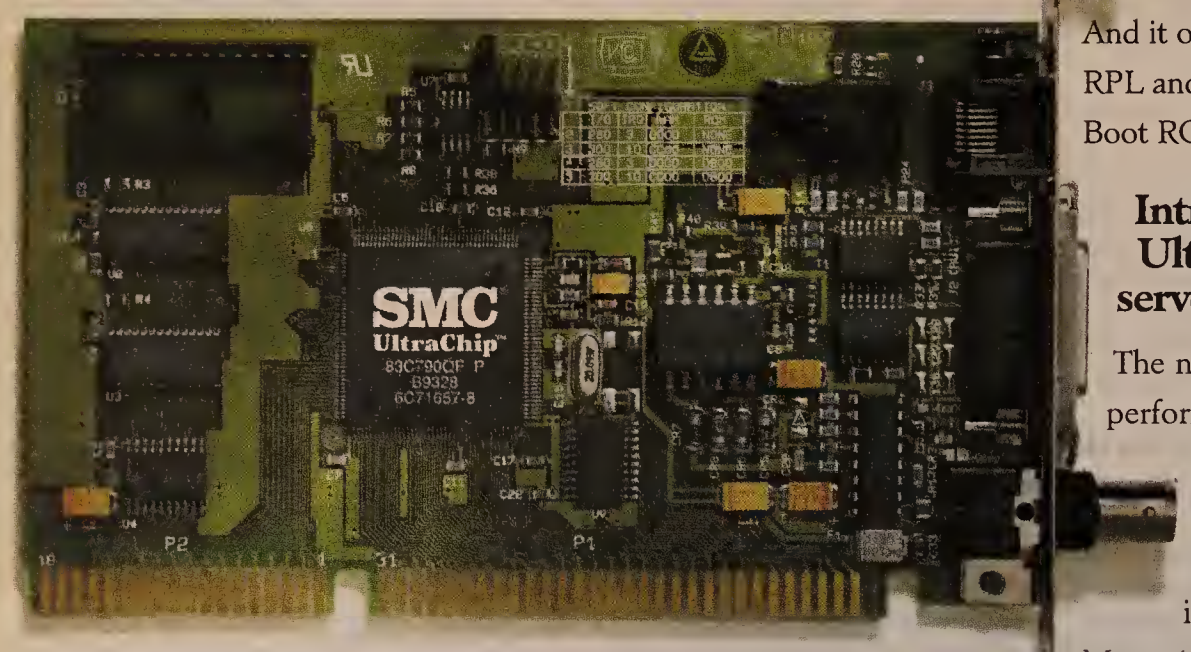

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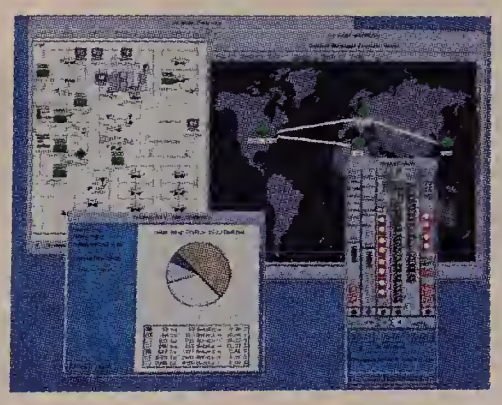

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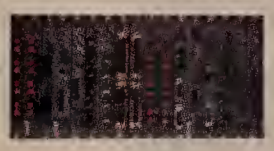

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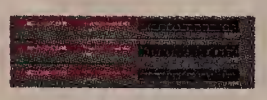

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New BBS products promote teaming across corporate nets

TeamTalk version on the right Trax.

BY KEVIN FOGARTY

Culver City, Calif.

Lotus Development Corp.'s Notes is suddenly getting a lot of competition — and not just from big rivals such as Microsoft Corp. and IBM.

One of the most recent nips at Lotus' heels comes from Trax Softworks, Inc. here, which has released beta versions of a major upgrade to its seven-month-old TeamTalk product.

The product is designed as a bulletin board on which users can post and respond to messages from other users in their company.

The upcoming version of TeamTalk provides electronic mail links that support Lotus' Vendor Independent Messaging (VIM) and Microsoft's Messaging Application Programming Interface message interoperability specifications. The VIM support will enable TeamTalk users to link with Notes discussion databases, among other things.

The new version also threads conferences, linking statements and replies hierarchically so users can read the substance of a conversation on a single topic. It also supports Microsoft's Open Database Connectivity protocol so customers can use third-party databases as message stores.

TeamTalk can also be used to build simple front-end applications in conjunction with such application development tools as Microsoft's Visual Basic.

Notwithstanding the new functionality of TeamTalk, it may be the product's basic bulletin board function that attracts users, said Heidi Dix, analyst for Forrester Research, Inc. in Cambridge, Mass. Group conferencing via bulletin boards is what first drew users to Notes, and even now, most users ignore or underutilize Notes' application development capabilities, she said.

Group conferencing products such as TeamTalk are good, low-cost alternatives to Notes, she said.

"For people who are just using Notes for group discussions or conferencing, that's really overkill," agreed Ronni Marshak, editor in chief of the *Workgroup Computing Report* from the Patricia Seybold Group, Inc. in Boston.

But TeamTalk's new functionality was needed to keep the product competitive with other entries in the market.

Other contenders in the group conferencing market are Team Software, Inc. of Houston and The Mesa Group, Inc. of Newton, Mass., both of which released products within the last year. Collabra Software, Inc. in Mountain View, Calif., is slated to release its first product next month.

Prices for TeamTalk start at $79 per client, with no charge for the message store on the server.

✆Trax: (310) 649-5800.

Team Software changes Channels.

BY ADAM GAFFIN

Houston

Team Software, Inc. today will announce an enhanced version of its bulletin board software with an improved capability for sharing large multimedia files across wide-area networks.

The company's Channels software provides conferencing functionality similar to that found in Lotus Development Corp. Notes, except that messages are exchanged in real time. The software features Windows clients and servers.

New in Channels Version 1.1 is the capability to automatically copy multimedia files transferred across a WAN to a local server, said company President Sean Doherty. This enables all other local requests for those files to be filled by the local server, reducing network traffic and speeding data access, Doherty said.

CHANNEL HANDLING

Channels uses remote procedure calls (RPC) to handle messaging and file transfers, which makes it different from other groupware and conferencing applications, such as Notes or Collabra Software, Inc.'s impending Collabra Share conferencing software. Those products rely on periodic replication and store-and-forward messaging, respectively.

Using RPCs lets users gain instant access to messages left in conferences, Doherty said. When a new message is posted to conferences to which they have access, their client software is notified and they can immediately read the message, he said.

LOWERING LOADS

According to Doherty, this architecture can mean dramatically smaller network loads because clients no longer have to frequently poll a central server or file server, as with messaging-based collaborative software. The RPC technology in Version 1.1 was tuned to allow for the local caching of multimedia files retrieved over a WAN, he added.

Channels supports both Microsoft Corp.'s Messaging Application Programming Interface and the Vendor Independent Messaging (VIM) API backed by Lotus and others. This support allows Channels users to exchange electronic mail with users of other products, such as Microsoft Mail and Notes.

The software also supports Microsoft's Object Linking and Embedding 1.0 technology for embedding objects within messages and documents left in its conferences.

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EDITORIAL

Playing fair

The Department of Justice's antitrust settlement with Microsoft Corp. certainly will appease computer hardware manufacturers, but there seems to be a consensus among others that the feds wimped out. And they did. The Justice Department settled for a political victory, not what's best for all involved.

The feds surprisingly did not address Microsoft's rather substantial influence over applications and their link to the company's operating systems. With its beta release of Chicago, Microsoft is pushing the envelope with desktop OSes by bundling in remote access, E-mail and other goodies. In essence, the company is building an interlocking empire of applications tightly wed to the OS — a strategy that would seem to guarantee it a fair chunk of the applications market.

What's more, if Microsoft is wise, it might decide to squeeze Novell to gain NOS market share by bundling E-mail, remote LAN access or other net services into Cairo for free or next to cost.

And since Gates & Co. just made peace with the Justice Department, there isn't likely anyone to stop Microsoft. The competition isn't ready. Novell surely will be distracted with its WordPerfect investment, Borland International is hurting, and Lotus has its own problems. Even if competitors were in better shape, Microsoft has already won — it has frozen the market with Chicago just like IBM did in the late '70s with its mainframes.

The residual fallout of this antitrust matter will come when Microsoft plays its full applications hand. If it turns out that bundling network and other services in Chicago, and eventually Cairo, works in favor of Microsoft and makes it difficult for third-party products to compete, then ultimately, the customer loses out. No user wants its hands tied so it has to deal with a single vendor.

Microsoft already is the largest software supplier, shipping nearly two million copies of Windows a month; it should be taking a larger view of the market. The company needs to be thinking about growing the market for network applications, not growing its own market share. Revenue and market share will come as demand for the technology increases.

One only needs to look back to the early days of Ethernet and the efforts by Xerox, Digital and others to make Ethernet a ubiquitous technology. Those companies opened up Ethernet for all firms to use.

Third-party developers should have equal footing with Microsoft's own units to build network applications tightly meshed with desktop and server OSes. By ensuring that third-party applications, as well as its own products, exploit the full potential of Chicago, Microsoft will assure buyers that it has their best interests at heart and enterprise network computing will flourish. And so will Microsoft.

Naturally, we're curious what you think about the antitrust ruling. Drop me a message.

➸CHARLES BRUNO cbruno@world.std.com

TELETOONS

FRANK AND TROISE

SPEAKING THE LANGUAGE

by Linda Musthaler

Fed approval of DSS creates data security dichotomy

On the surface, the Digital Signature Standard (DSS), which was finally issued by the National Institute of Standards and Technology (NIST), looks as though it will help to promote electronic data interchange applications and other forms of electronic commerce (May 30, page 3). On the contrary, the DSS stifles the move toward electronic commerce and fragments support for digital signatures. This affects the public and private sectors, and could impact your plans for EDI.

Scientists at NIST's Computer Systems Laboratory (CSL) designed the DSS as a standard tool for verifying the senders and contents of messages transmitted electronically. Its use is mandatory for federal agencies signing documents that are exchanged via computer networks.

In designing the DSS, CSL recommended that digital signatures be encrypted using the Digital Signature Algorithm (DSA). DSA is based on public-key technology, in which a private key is used to encrypt a message and a public key to decrypt it. The problem is, the rights to public-key patents are held by Public Key Partners, Inc. (PKP), a group consisting of the technology company RSA Data Security, Inc., two universities and a German professor.

As luck would have it, the federal government sponsored the research that led to the creation of the DSA, which PKP is now laying claims to because of its public-key patents. Because of this government sponsorship, federal agencies — as well as state and local governments — are exempt from paying licensing fees for the use of PKP's patented technology. However, private businesses that incorporate the algorithm into their products would have to pay PKP a royalty fee. As you might imagine, this royalty arrangement sits well with the feds, but not so well with private industry.

Despite significant objections by companies in the computer security industry, NIST went ahead and approved the DSS as the mandated government standard. Industry objects to the DSS standard for two main reasons. One is the royalty issue. In order to comply with the government's DSS standard, vendors that develop security products using this technology would have to pay PKP royalties of as much as 2.5% of sales revenues for hardware products and up to 5% for software products. It doesn't take a rocket scientist to realize that such costs would ultimately be passed along to the consumer in the form of higher prices for products incorporating the DSS.

The second — and perhaps more important — reason that industry objects to the DSS standard is that many vendors already support a de facto standard for electronic signature encryption called RSA. RSA — developed and marketed by PKP consortium member RSA Data Security — also relies on public-key technology, but uses a different encryption algorithm than the DSA. RSA is widely accepted and used in more than 300 commercial products today; some experts believe it is superior to the DSS.

The government mandate for the DSS essentially sets up a dual-standard system — one for government agencies and their business partners, and one for just about everyone else. The trouble is, "everyone else" comes down to companies like yours and mine, which may someday need to do business with the government electronically. In order to do so, our companies must comply with government EDI standards.

By pursuing its DSS policy, NIST has created a state of confusion rather than set a direction. Vendors that make data security products have to decide which standard to embrace. Adding DSS support to products that currently support only RSA will require modifications and added costs. And users — people like you and me — have to buy products that support both standards, or risk being unable to do business with organizations that use the standard we don't support.

Many companies already have made a significant investment in hardware and software to support the de facto RSA standard. To switch to the DSS could be quite costly.

As an example, here is the type of hardware that is needed to support a secure data transfer application. A printed circuit board is installed in an Intel-based PC. This board authenticates users, encrypts messages and electronically signs purchase orders, vouchers and contracts. The workstation also needs a card reader, and each authorized user has a smart card. The card has a gold chip that contains the individual's name, password and access levels.

Now, not every workstation needs this equipment; only those PCs that perform certain functions. However, some companies and government agencies are moving toward smart cards to replace network logon passwords. In that case, all workstations would need to be equipped with the specialized devices.

If government and industry could agree on a single electronic signature standard, we would likely see a wave of new EDI applications. This could reduce cumbersome paperwork, save time and money and move us more toward that elusive world of letting computers talk directly to one another.

So which way do you turn? I suggest betting on the RSA de facto standard. It already has broad vendor support, including from Microsoft Corp., which is integrating the technology into Cairo, a future version of Windows NT. Moreover, the DSS still has a few legal challenges surrounding the patent issue. This should make vendors hesitant to develop products based on the DSS until the disputes are settled.

RSA Data Security has also developed a technology called Abuse Resistant Key Distribution (ARKD), which publishers could use to distribute securely encrypted copies of their software products on CD-ROM or over networks. ARKD utilizes the RSA algorithm.

And finally, even a few government agencies have already implemented applications using RSA because they just couldn't wait for DSS approval. Most notably, the Internal Revenue Service gave the nod to the RSA standard in order to meet an urgent application deadline (June 20, page 15).

Our federal government should take a lesson from the Government Open Systems Interconnection Profile (GOSIP) debacle and rethink its position on this technology stance. A standard that few vendors and users support is no standard at all.

➸Musthaler is vice president of research at Currid & Co., a Houston-based technology consulting firm. She can be reached at (713) 789-5995.

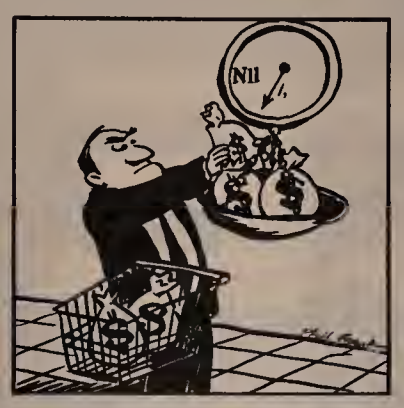
INFORMATION SUPERHIGHWAY

by Art Barber

Who's going to pay for the NII?

The National Information Infrastructure (NII) is a concept that is destined to fail. Instead of producing more jobs and and improving education, it will produce only higher telephone rates. Rep. Ron Wyden (D-Ore.) has said that constituents have told him they do not wish to be dragged kicking and screaming onto the Information Superhighway to be run over by higher rates for services they do not want.

Despite the use of the phrase Information Superhighway in almost every newspaper and TV news program nearly every day, no one in the Clinton administration can define the Information Superhighway or present a plan for building it. There is no plan. Nevertheless, Sen. Daniel Inouye (D-Hawaii) has introduced legislation that would reserve capacity on the NII for schools and other nonprofit groups at little or no cost. But who is going to provide these free services?



The media and some politicians have led us to believe that the Information Superhighway will develop like the federal highway program, which was funded primarily by the federal government. That isn't going to happen. The money is not available.

Instead, Washington says, the NII will be developed according to new laws and rules created by the government, and built by private contractors who will invest billions to meet public demand for new products and services. But the idea of a federal NII created by government rules, funded and operated by private industry to serve the public, is an oxymoron.

The Clinton administration would have us believe that we need new technology and new regulations. False. What is needed is demand. The technology is readily available, and regulations do not limit anyone but AT&T from competing in the local telephone marketplace.

The administration is trying to sell the communications industry a field of dreams: Build the Information Superhighway and the revenue will come. Yet until someone can identify new services that users will pay for, private investment will be limited. Higher telephone rates to pay for the fiber highway are far more likely.

For years, telephone companies have sought higher telephone rates to provide fiber to every customer. Currently, the Pennsylvania Public Service Commission is reviewing a request from Bell Atlantic Corp. to increase telephone rates in order to generate the funds to provide fiber service to all customers, whether they want it or not. To date, state public utility commissions have without exception stuck to the rule that telephone revenue is to be used to maintain inexpensive telephone service and not for investment in competitive communications markets.

If passed, the National Communications Competition and Information Infrastructure Act of 1993 (H.R. 3636), which the administration has endorsed, would transfer responsibility for local rates to the Federal Communications Commission, which would drop the present restrictions on the use of telephone revenues. The administration and the press refer to present state laws that maintain low telephone rates as obsolete regulations. They are nothing of the kind. Local telephone companies can invest stockholder funds in any new venture. They simply cannot use telephone revenues and increase rates to do so.

H.R. 3636 is similar to the 1982 cable law that deregulated the cable monopoly, and if passed, is likely to have similar consequences — higher rates, a public clamor for correction, and eight to 10 years from now, Congress may well attempt to return to the rules in existence today. The House passed H.R. 3636 a few weeks ago without debate. If the Senate also passes it and the president signs the bill, telephone rates will go up, telephone revenue will be used to make bad investments and billions will be lost generating services that do not sell.

Republicans are already loading their cannon for 1996 when they will claim that the Clinton-Gore team's communications policies did nothing but unnecessarily increase telephone rates. The Clinton-Gore team should shift its attention to the effective management of the billions spent for federal communications networks and leave the regulation of local rates to the states. Washington has yet to learn the lesson of the collapse of the Soviet Union: A large and complex economy cannot be managed by a central bureaucracy, whether in Moscow, Beijing or Washington. Let's let the public decide what they want to pay for.

Barber is president of PrivateNet, Inc. in Bethesda, Md. He can be reached at (301) 320-4333.

Letters

Cartoon kudos

I just wanted to take a moment from these Washington dog days outside and bone-chilling conditions inside to say how much I have enjoyed Teletoons throughout the years.

What a chuckle Phil Frank's drawings and Joe Troise's captions bring to me.

The fun and games place mat (March 28, page 47) was great and so was the astrological guide (Dec. 21, 1992, page 43).

Such creativity and talent have created quite a following.

With everyday emergencies and trials plastered all over the media, Teletoons is definitely a welcome treat.

Thanks again, guys.

Chuck Angelucci
Financial analyst
U.S. Department of Housing and Urban Development
Arlington, Va.

Graham cracker

I would like to respond to a comment by Graham Morrison in the June 27 issue ("IBM set for its ATM coming-out party," page 1) regarding IBM's commitment to 25.6M bit/sec Asynchronous Transfer Mode (ATM) LAN support. I would like to make it quite clear that IBM is in full support of both the ATM Forum's work and the ATM standards process.

We continue to support the need for a low-cost, medium-speed alternative for ATM because of customer interest. A number of key suppliers support 25M bit/sec ATM, 16 of whom have plans to provide 25M bit/sec offerings.

Although 25.6M bit/sec is not currently a standard (neither is 51.84M bit/sec), we are in the process of proposing the 25.6M bit/sec interface as a customer installation interface for access to ATM networks to the ANSI T-1 committee, and we are actively working with the IEEE 802 committee to gain consideration for 25.6M bit/sec as a physical layer for LANs. IBM believes that 25.6M bit/sec meets a real customer need, and we intend to aggressively support it as a useful customer option.

Edward Harbour
Product manager, wide-area and ATM adapters
IBM Networking Hardware Division
Research Triangle Park, N.C.

Editor's response: Mr. Harbour refers to a comment by Morrison, a project leader with Blue Cross/Blue Shield of Connecticut who questioned IBM's 25M bit/sec nonstandard proposal and maintained the vendor cannot drive networking standards as it once did with token ring.

Making the (up)grade

I just read Mark Gibbs' column "Upgrades and the 'mud of the marketplace'" (June 6, page 29) and wanted to tell you how much I agree with him. The biggest problem I've ever had in this business was convincing some people (upper management, clerks and programmers) that there is no such thing as a long-term silver bullet — except for the one that hits you right between the eyes if you're standing still.

Thanks to Gibbs for his open and clear communication. Keep it up.

Bradford Race
Senior programmer/analyst
Solarex Corp.
Frederick, Md.

Far-out contention

As a consultant specializing in internets and high-speed nets, I was very interested in the case study in which Concurrent Technology Corp. (CTC) looked at various high-speed LAN technologies to determine an upgrade path from standard Ethernet (June 27). I was absolutely astounded to learn that they rejected FDDI because "it is contention-based." That's like refusing to live in Honolulu because it snows all the time. FDDI uses time tokens, of course. What planet is CTC living on?

V.C. Marney-Petix
Chief consultant
Marpet Tech Services
Fremont, Calif.

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SWITCHED DIGITAL SERVICES

Switch trio boosts bandwidth

BY J. SCOTT HAUGDAHL

Ethernet switches from Alantec, Kalpana and LANNET relieve traffic congestion and speed throughput but satisfy different network needs.

Ethernet switch vendors hawk their wares with bold promises of increased bandwidth. But the true test of their worth is whether they can relieve congestion and saturation. To separate the myth from reality, we brought several switches into the lab and tested their performance. In this first installment of a continuing series of switch reviews, we looked at the Alantec Corp. PowerHub 3000, the Kalpana, Inc. EtherSwitch EPS-2015 and the LANNET, Inc. MultiNet.

As it turns out, making apples-to-apples comparisons of Ethernet switches is not a straightforward task. No two switches, it seems, are alike. Some high-end switches, for instance, include routing capability, while other switches offer full-duplex capability. We chose three switches that are based on different architectures and targeted at different markets.

We did, however, apply one particular criterion to our selections. We decided to limit our interest to products with individually switched ports in order to get a more accurate assessment of their performance capabilities. We excluded switches that assigned groups of ports to one Ethernet segment or bus.

What we found was that when used appropriately, these switches are a bandwidth boon for congested networks. The decision to use any one of these three switches will ultimately depend on the network environment and its needs. The Alantec PowerHub, for instance, is best suited for backbone or enterprise switching tasks. With built-in routing capability for all ports, it's a good solution for collapsed backbone applications.

Our tests also showed that LANNET's MultiNet is ideal for backbone and intraworkgroup switching needs. It exhibited low packet-forwarding overhead, allowing it to handle multimedia environments.

Kalpana's EPS-2015, the least expensive of the three switches, displays the lowest delay times (latency) and is adept at switching individual stations in a workgroup setting. It also offers full-duplex capability for all its switch ports.

SETTING THE STAGE

The Alantec PowerHub, a store-and-forward switching hub, supports 12 half-duplex Ethernet segments, as well as integrated bridging, virtual local-area network and multiprotocol routing over each Ethernet segment. It also offers optional Fiber Distributed Data Interface modules. In fact, the PowerHub is really a combination bridge, router and hub in one box. Our PowerHub test configuration supported 12 attachment unit interface (AUI) connections, but other configurations are available that support as many as 76 10Base-T ports spread over 12 Ethernet segments.

The EPS-2015 is a slim, 15-port cut-through stackable switch designed to complement the connectivity of stackable and multisegment hubs. A maximum of four units may be stacked (via three 20M bit/sec EtherChannels), providing a total of 60 switched half-duplex or full-duplex Ethernet ports.

Unlike the first two products, which are stand-alone or rack-mountable, self-contained units, LANNET's MultiNet is actually a family of hubs with Active Star Enclosures. Three enclosures are available, depending on the number of ports required. Ethernet, token-ring and FDDI connections are also available. Our review unit, the LET-10 enclosure, allows as many as three modules to be plugged in, providing up to 24 individually switched ports. All ports can be switched over a 1.28M bit/sec backplane.

Our unit had two LSE-808 LANswitch eight-port Ethernet modules and one LSE-208 LANswitch eight-port, two-bus (four ports per bus) Ethernet module. However, to remain true to our selection criteria, we only tested the LSE-808 modules.

Simple Network Management Protocol capability is built into all of these switches. In order to manage these switches via SNMP, however, net managers need the Management Information Base extensions supplied with the switches, an SNMP console and Transmission Control Protocol/Internet Protocol. None of these switches currently support SNMP over Novell, Inc.'s Internetwork Packet Exchange (IPX).

AN ARCHITECTURAL DEBATE

The EPS-2015 relies on a technology commonly referred to as cut-through. In this architectural design, the packet-forwarding procedure is initiated before the entire packet is received from the source port. The switch only needs to look at the destination and source addresses at the beginning of each packet before making forwarding decisions.

Consequently, cut-through switches typically exhibit very low latency. Latency is especially important if packets have to traverse more than one switch to arrive at its destination, as in a hierarchical network.

There are, however, two notable disadvantages with this approach. First, whenever a packet begins forwarding while it is still receiving, it cannot be sent to a higher speed port — such as one connected to Asynchronous Transfer Mode, 100M bit/sec Ethernet or FDDI networks — since the higher speed port will quickly run out of bits. Secondly, there is no cyclic redundancy check (CRC) error checking. It's worth noting, however, that CRC errors are relatively rare occurrences and that, if they do occur, the problem packets will be rejected by the receiving controller.

In contrast to this cut-through design, most switch vendors employ a store-and-forward architecture. The entire packet must be received before it can be forwarded to the destination port. The drawback to this approach is that overall delay, or latency, is increased, especially with large packets since nothing can happen until the entire packet is inside the hub.

However, vendors that use this design are quick to point out that this store-and-forward approach allows for CRC error checking. But perhaps the greatest advantage of this approach is that it enables packets to pass to higher speed networks at the higher speeds.

Clearly, both approaches have their application niches. Cut-through switches serve the needs of workgroup environments that need to minimize delay, while store-and-forward switches allow users to take full advantage of higher speed network connections.

Early indications are that multimedia applications may also run a bit smoother on store-and-forward switches, particularly on

Continued on page 48

NET Result

Product	PowerHub 3000	EtherSwitch EPS-2015	MultiNet
Key findings	▸ Built-in routing capability is well suited to collapsed backbone applications. ▸ Based on a store-and-forward architecture.	▸ Cut-through design mimimizes latency. ▸ Offers full-duplex capability. ▸ Well suited to workgroup environments.	▸ Low packet forwarding overhead keeps throughput high. ▸ Suitable for workgroup and backbone applications.
Configuration tested	12 AUI ports	15 ports	▸ LET-10 chassis ▸ 16 individually switched ports ▸ 8 shared ports (not tested)
Vendor	Alantec Corp. 70 Plumeria Drive San Jose, Calif. 95134 (800) 252-6832	Kalpana, Inc. 1154 East Arques Sunnyvale, Calif. 94086 (408) 749-1900	LANNET, Inc. 17942 Cowan Ave. Irvine, Calif. 92714 (714) 752-6638
Price as tested	$19,800	$8,500	$17,800

Continued from page 47

switches with minimal forwarding-decision overhead, such as the LANNET MultiNet. However, the final verdict on multimedia is not in yet. There are many variables that affect performance, such as compression, update rate, image size, quality of video required and voice-over. And the installed base is still quite low.

Maximum throughput without packet loss
(packet/sec)

Packet size	EtherSwitch EPS-2015	MultiNet	PowerHub3000	Theoretical maximum throughput
64	14,184	11,481	9,106	14,880
128	5,838	8,352	6,616	8,445
256	2,918	4,334	3,430	4,528
512	2,340	2,234	2,200	2,349
1,024	1,012	1,194	1,156	1,197
1,518	756	807	790	812

In our four-stream PowerBits test, MultiNet's low packet forwarding overhead helped it achieve the highest throughput level for all but 64-byte packet sizes.

Maximum throughput without packet loss in a client/server environment
(packet/sec)

Packet size	EtherSwitch EPS-2015	MultiNet	PowerHub 3000
64	8,910	2,976	1,473
128	7,600	2,530	840
256	4,075	2,716	2,263
512	2,114	1,644	1,644
1,024	1,197	957	957
1,518	812	730	648

In our second throughput test, we sent data on two streams while 64-byte acknowledgment packets were returned on two other data streams. The EtherSwitch EPS-2015 came out on top in this client/server test.

ON WITH THE TEST

For this review, we created a new suite of benchmarks that we believe are more realistic than tests that, for example, look only at one-way throughput for multiple streams of packets.

The bottom line, however, is that the benchmarks provided here are simply another set of metrics for users to consider. No single metric should ever be the sole consideration.

Network managers should also examine other factors, such as SNMP manageability, routing, built-in bridging and routing to other network topologies and virtual LAN (logical grouping of ports) capability. The Alantec PowerHub, in fact, takes an all-in-one approach, putting switching, bridging and routing capability in a single box. The advantage is that all ports are routable, effectively putting 12 routers in a 12-port box — a cost-effective collapsed backbone solution.

It is also possible to address many of these issues by attaching a router to a switch port. The switch will learn the router's address, just as it does for any other device. And the prices of routers have plummeted recently. Complete hardware-based multiprotocol routers are now available for under $2,000.

One advantage of this approach is that it decouples the decision to update the router from the switch. On the other hand, attaching a router to a switch adds yet another layer of latency.

LATENT ISSUES

Latency is measured from the time that the first bit of a packet is transmitted on one port to the time that the first packet bit is received on a second port. Effectively, it governs two-way conversations — even with full-duplex ports.

For the most part, latency does not affect one-way throughput for large packet buffers. Once the first packet comes through, the others will follow at back-to-back speeds. It's like 10 firefighters sliding down a pole: There will be a slight delay as the first firefighter slides down the pole, but the others will follow immediately, creating a constant stream. Similarly, most switches can pass Ethernet packets at wire speed in a single direction.

However, this is a best case scenario. Once two-way communication is introduced — a send packet from a client and a receive packet from a server, for instance — latency becomes an issue. Network protocols, such as NetWare's burst protocol, can help but not eliminate latency, much like burst protocols can help on a wide-area network. If there are multiple hops (switches), latency becomes even more of a factor.

Using our client/server test setup, we measured the round-trip delay of several NetWare Core Protocol packets on the wire. To measure latency, we used the command packet, which a workstation sends out as a request to the server, and the corresponding response packet, the server's response to the workstation's request.

We subtracted the amount of time between the command and response packets on the server side of the switch from the same command and response packets' delta time on the workstation side to arrive at the latency measurement.

Since our measurement is based on both the command and reply packets, it's higher than the typical latency measurements cited by vendors.

We have reservations about tests that rely on multiples of 64-byte packets, such as 128-, 512- and 1,024-byte packets. Real-world environments will, of course, have many 64-byte packets because it's the minimum Ethernet packet size. However, we have rarely encountered these other multiples of 64-byte packets in the field. It's not uncommon to encounter sizes such as 68-, 91-, 457- and 1,515-byte packets. Yes Virgina, odd packet sizes really do exist.

Accordingly, we based our measurements on packets sizes of anything but multipliers of two — with the exception of 64-byte packets.

As we expected, the cut-through switch, the EPS-2015, exhibited the lowest latency — approximately 100 microsec, plus or minus 15 microsec. The Network General Corp. Sniffers we used in our tests have a 15 microsec time stamp resolution. Our finding closely matched the vendor's claim of 40 microsec, which, when doubled to reflect our measurement of the command-response pair, is 80 microsec. For the EPS-2015, latency proved to be constant, showing no variation as we increased the packet sizes.

For the other two switches, however, latency was influenced by the packet size. The rate at which data is passed on a standard 10M bit/sec Ethernet is 1 bit per microsec. Thus, a 64-byte Ethernet packet (including CRC) is transmitted in 83.2 microsec — 6.4 microsec for the 64-bit preamble plus 9.6 microsec for the interpacket gap time plus 67.2 microsec for the 64-byte packet. A 150-byte packet requires 136 microsec, and a 1,200-byte packet is transmitted in 976 microsec.

For a 457-byte packet with a 64-byte response packet, PowerHub turned in an average latency of about 550 microsec. MultiNet was a bit faster, exhibiting an average close to 463 microsec. The theoretical minimum for store-and-forward of a 457-byte packet followed by a store-and-forward of a 64-byte response is 449.8 microsec. Thus, the overhead times (for the frame pair) were approximately 100 microsec for PowerHub and 13 microsec for MultiNet.

FILE TRANSFER COMPLETE

Next, we set out to determine how latency affects workstation/server transactions. We transferred a 2.3M-byte file from the workstation to the server. We repeated this test several times to ensure consistency and to account for any write caching by the server.

Other benchmarks may show switches transferring data between all ports at or near wire speed.

Our benchmark, however, shows the best performance that users can expect on any given port for a real set of transactions.

With a direct connection to the server — that is, with no switch — the file transfer required 3.84 seconds to complete. This translated to a rate of nearly 600K byte/sec, which consumed almost one-half of the available Ethernet bandwidth. The speed of this transfer was attributable not only to high-performance hardware and software, but to NetWare 3.12's burst protocol and virtual loadable module workstation drivers. NetWare's burst protocol capability also enabled the switches to enjoy the benefit of several large one-way packet bursts.

The EPS-2015 turned in the lowest time, averaging 3.89 seconds (1% overhead), while MultiNet and PowerHub were virtually tied at 4.11 seconds (7% overhead) and 4.16 seconds (8% overhead), respectively. These performance figures are quite respectable, even for the store-and-forward switching hubs.

Our next test was designed to measure the effect of background traffic on the above file-transfer task. We attached a simulated eight-node peer-to-peer LAN to a switch port and connected a 1,400-node bridged backbone to another port. Each of these two segments carried 40% to 50% loads.

We wanted to see whether the file-transfer

Continued on page 51

HOW WE *did it*

We conducted tests using two different setups. Our first setup consisted of a Novell, Inc. NetWare 3.12 server on its own dedicated 10M bit/sec Ethernet segment attached to one switch port. We attached a workstation to another port. The server was dedicated to the workstation across the switch, and there were no other stations attached to the workstation or server segments.

After we measured the delay characteristics of the switch in a no-load environment, we added two more segments to two additional switch ports. Attached to one port was a simulated backbone with heavy bridged traffic (1,400 nodes). Attached to another port was an eight-node peer-to-peer LAN. We used this setup to measure the impact of background traffic — traffic that didn't pass through the switch — to see how performance was affected when the switch had to look up addresses for hundreds of packets per second.

For our second test setup, we used the Alantec Corp. PowerBits traffic generator. We designed our test script so that for every packet sent through a switch, a 64-byte packet was returned on the reverse path. This setup let us test the maximum rate at which the switches handled data packets sent from one port to another in a simulated, one-to-one, client/server environment. The test was performed with two transmit and two receive ports. Data packets were transmitted under two scenarios: back-to-back bursts and packet loss rate.

Using tricks of the trade

Most net managers are used to monitoring traffic by attaching protocol analyzers to their networks. Monitoring port traffic, however, is not as easy. Since a switch port may be a dedicated connection to a server or workstation, it is difficult to monitor that port with a protocol analyzer. It's not as simple as plugging an analyzer into another switch port because traffic is isolated on a port-by-port basis.

But there is another way.

For our testing, we attached 3Com Corp. LinkBuilder hubs to all the switch ports we used. We then attached our protocol analyzer and other nodes to these hubs. With this setup, we were able to fully monitor all incoming and outgoing port traffic.

Every protocol analysis engineer should have a small four-port hub in their bag of tricks. Transition Engineering, Inc. makes one of the smallest that we've seen — the Pocket Hub, which measures just 4 1/4 by 2 3/4 by 7/8 inches.

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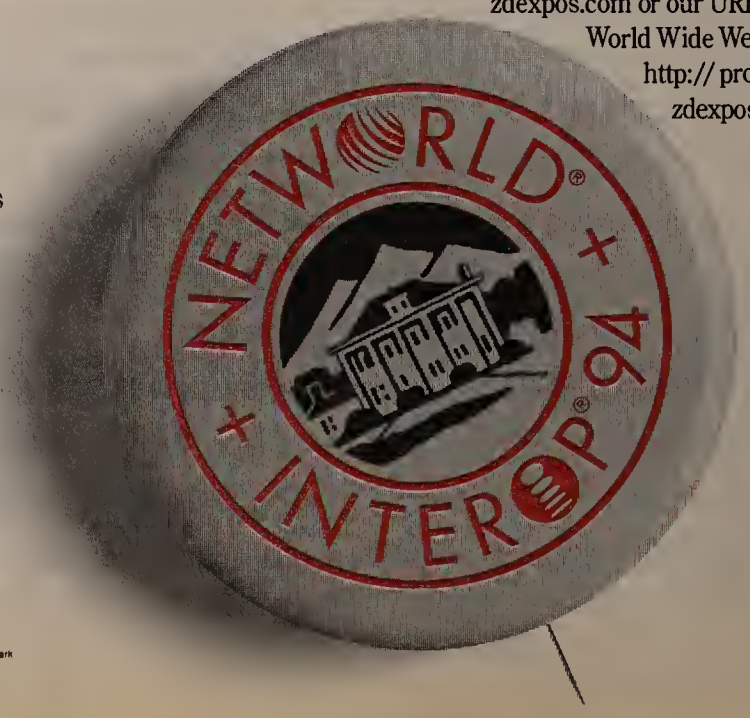

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Switching to SwitchIt

Can a $395 software product that turns a personal computer into a multiport, store-and-forward switch compete with hardware designs?

Well, we were curious, so we took a look at SwitchIt from Triticom, part of a family of software-based Ethernet connectivity products.

The manual for SwitchIt notes that performance depends on the system's configuration. The CPU and network adapter are particularly important. We installed the product in a 66-MHz, 80486 DX2 CPU with four 16-bit NE2000 adapters — the most adapters that SwitchIt can accommodate.

We used the same tests that we relied on for our Ethernet switch testing. For a 457-byte packet, the measured latency was 475 microsec per packet. In contrast, MultiNet and PowerHub registered latency times of 13 and 100 microsec, respectively. The latency overhead of SwitchIt was also evident in our 2.3M-byte file-transfer benchmark, registering at 6.35 seconds, or 65%. The baseline measurement — that is, without an intervening hardware or software switch — was 3.84 seconds.

The manual indicates that SwitchIt is capable of forwarding more than 10,000 packets per second. However, when we subjected the switch to the more grueling two-way tests that we applied to the hardware switches, it did not exceed 202 packet/sec for 1,518-byte packets. At this rate, we measured a 14% packet loss.

For 1,024-byte packets, throughput did not exceed 286 packet/sec (with 28% packet loss). For 64-byte packets, the maximum throughout was 1,467 packet/sec, with a whopping 67% of packets lost. Of course, the SwitchIt performance is limited not only by latency, but also by the small, 16K-byte buffers on the NE2000 adapter cards.

To satisfy our curiosity about SwitchIt, we also conducted a test, which forwarded packets on a single port, with no acknowledgment packets. When we relieved the multiport stress, SwitchIt performed better. For 1,024-byte packets, the maximum forwarding rate with no loss was 477 packet/sec, or about 41% of the theoretical maximum of 1,197 packet/sec.

Users also need to understand that there are some hidden costs with this software switching approach. By the time we factored in the cost of the software, our PC and four Ethernet adapters, our $395 software switch turned into a $2,000 — $500 per port — investment.

SwitchIt performed best in our real-world benchmark but still trailed far behind the hardware switches. Perhaps the best application for these software-based products is in small nets where users can tolerate fairly high performance penalties for occasional file accesses across isolated segments. But this is clearly not an adequate remedy for larger, mission-critical network applications.

Continued from page 48

rate was affected by the switches having to look up header information of the newly introduced packet to determine if they required forwarding. We made sure that we paired all the nodes on each segment with other node addresses on the same segment so that traffic would not have to pass through the switch.

All three of the switches passed the blocking test. That is, they prevented packets from passing between the two segments. We also found that this test scenario had minimal impact on the actual file transfer. These switches rely on additional hardware (on each port) to look up addresses, thus off-loading the burden from the main CPU.

PUT THE PEDAL TO THE METAL

Finally, we switched gears and used an Alantec PowerBits generator to create data streams and measure throughput. We wanted to avoid one-way packet streams, so we used a test script that ensured 64-byte acknowledgments were returned in response to every packet sent.

Unfortunately, a major limitation of the PowerBits is that packet sizes must be in multiples of 64 bytes. Thus, we were unable to test performance with packet sizes that better mirrored the activity on real networks.

We believe that this is a serious problem that Alantec needs to address.

We conducted two tests with the PowerBits generator — throughput and packet-loss rate. Both of these iterative test applications are supplied with the PowerBits unit and require four switch ports. We conducted the tests with 64-, 128-, 512-, 1,024- and 1,518-byte packages. The total run-time for each test was 10 seconds.

The throughput test determines the maximum packet-forwarding rate without any

See **Switches**, *page 54*

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A PRIMER on emerging technologies

CLI lets SQL put on a happy (inter) face

BY MERRILL HOLT

SQL, the relational database language invented by IBM nearly 20 years ago, is getting a face-lift. Call Level Interface (CLI), the newest SQL application program interface, enables the linking of applications to a wide variety of SQL databases.

The days of needing to build separate front-end application versions for each target back-end database server will soon be a drudgery of the past. In fact, users and vendors alike, taken in by the ability to interoperate with multiple servers from different vendors, are readily adopting the SQL CLI even prior to its finalization.

The key to CLI's virtually guaranteed success? By standardizing on a common set of programming subroutines for the interface, CLI makes it possible to access different brand database servers. Such a level of interoperability has the entire computing industry, from programmers to information systems professionals, rallying around the CLI specification.

Prior to the introduction of CLI, database programmers typically used embedded SQL where the database statements would be identified by the prefix EXEC SQL. A preprocessor would transform the program containing a mix of SQL and host language statements into pure source code. Next, the SQL statements would be replaced with subroutine calls to the run-time library of the SQL implementation. This meant that when an application needed to operate with more than one SQL implementation, the application had to be precompiled, compiled and linked for each target. While this approach worked well, it was a tedious and time-consuming process since each vendor's translation was proprietary.

CLI call types

- Allocation and deallocation
- Get and set attributes
- Connection management
- Descriptor access
- SQL statement execution
- Manipulation of tabular results
- Metadata functions
- Introspection (implementation characteristics)
- Transaction control
- Diagnostic information
- Multithreading support

BACKGROUND ON CLI

CLI is the brainchild of the SQL Access Group, a consortium of approximately 25 vendors founded in 1989 that meets regularly to develop industry specifications for SQL technology. Its work on the CLI specification is now approaching completion, and the final version is expected to be published before year end.

As is the case with all proposed SQL Access Group specifications, the CLI moves through three stages: snapshot, preliminary and final. Throughout the process, the SQL Access Group works cooperatively with X/Open Company, Ltd., a consortium of computer vendors, software developers and users, to ensure that any product adhering to the CLI interface will also meet X/Open requirements for portability and interoperability. In addition to its becoming part of the X/Open Portability Guide, the interface is being progressed through the standards bodies, including ANSI and the International Standards Association, and will become part of the ISO SQL standard as early as 1995.

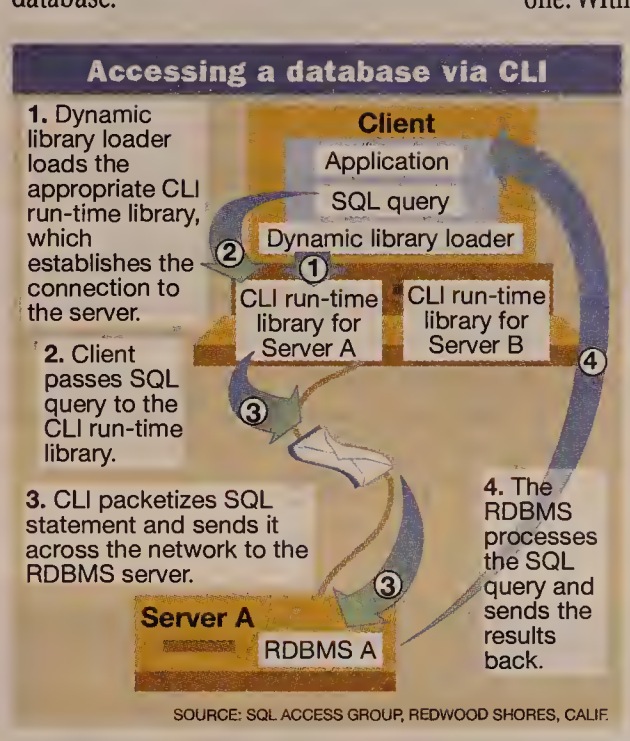
SQL SPECIFICATIONS

In addition to the publication on CLI, other specifications include the SQL language and embedded interface, and Remote Database Access. The specification on SQL is needed to complement the CLI since the CLI specification is only the interface and does not define the SQL syntax and semantics. If a single application is to be used at run-time with multiple implementations, the SQL statements used by the application must either conform to the common subset or the application must have logic that is specific to the different implementations.

The leading SQL implementations have been developed to adhere to increasingly higher levels of the SQL standard. That means the common subset of SQL that is portable and interoperable continues to become richer, and today it is possible to write significant applications without using vendor-specific extensions.

SQL applications are usually split with the client accessing a server across the network. The SQL Access Group's SQL specification is based on the 1992 ANSI/ISO standard. It includes several extensions, such as management of indexes, that are not part of the standard but, for the most part, CLI is a subset of the standard.

The SQL Access Group has chosen those features from the ANSI/ISO standard that are critical for supporting applications that are portable and interoperable. For example, the client uses a connect call to establish the association with the server. The server manages the data and metadata — the information that describes the tables stored in the database — in a particular database.



A crucial element of the CLI is the client library, which houses the programming calls and most often includes the networking component needed to establish the connection to the server. This software is provided by the SQL vendor and is specific to a vendor's server. SQL vendors provide networking software for use over a wide variety of transports.

HOW IT WORKS

These calls are designed to minimize the amount of processing required on the client. In general, the client constructs an SQL statement as a string and passes it to the server via an execute routine.

In the case of a query that returns rows, for instance, the results may be retrieved by the client through a series of calls to a fetch routine. The columns in the result set can be bound to variables in the application program.

The interface has also been designed so the client does not need to determine the type — select, update, delete or insert — of SQL statement prior to sending it to the server.

Calls allow the client to determine the number of rows in the result and to determine the number of columns and the data types of the columns.

CLI snapshot

Microsoft Corp.'s industry-standard database protocol, Open Database Connectivity, is based on the snapshot version of the CLI developed by the SQL Access Group.

The CLI interface is defined in terms of an environment of which there is at least one. Within the environment there are connections to servers, and within the connection there are handles to statements. On a connection there may be multiple statements in use.

In order for a program to manage multiple select statements, a cursor is opened implicitly when a select statement is executed that returns multiple rows. (A cursor is conceptually a pointer into the result table produced when a select is executed.) An application may then fetch results from these cursors.

By utilizing handles, the CLI avoids the need for global variables and can thus be implemented efficiently in an environment where multiple threads of execution are used.

CLI'S ADVANTAGE

The SQL CLI client/server architecture offers several advantages for interoperability. It builds on the existing client/server implementations that the relational database vendors have today, including the network component.

Most SQL vendors provide a rich set of network drivers for a wide variety of networking environments including open systems such as Transmission Control Protocol/Internet Protocol and Open Systems Interconnection, and proprietary networks such as IBM's Systems Network Architecture and Novell, Inc.'s NetWare.

CLI implementations are now available for client systems, including Microsoft Windows and most Unix workstations.

The SQL CLI has been readily adopted by vendors and users even prior to its finalization. As it is refined, it will enable a new class of SQL-aware applications that can access data in a variety of servers using SQL.

Holt is a principal product manager for Oracle Corp. in Redwood Shores, Calif., and vice chair of the SQL Access Group. He can be reached via the Internet at mholt@us.oracle.com.

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Switches

Continued from page 51

packet loss. It runs a series of stream tests, performing a binary search over the range of possible throughput rates. We set up four streams: two streams going one direction and two streams reversing back over the same path, with the same packet sizes.

MultiNet achieved the highest throughput rating in all but the 64-byte packet size category, where the honors went to EPS-2015 (see graphic, page 48). MultiNet's low forwarding overhead seems to have paid off in the throughput test.

However, PowerHub's forwarding rate is slowed by its routing capability, which increases its overhead.

MODIFYING THE TEST

We then modified the throughput test to give it a real-world, client/server flavor. Using the same packet sizes, we set sent information on two streams, while 64-byte acknowledgment packets were returned on two other data streams. The EtherSwitch came out on top, indicating its ability to reach high throughput levels without losing any packets (see graphic, page 48).

Although the MultiNet and PowerHub throughput numbers are lower, they don't tell the whole story. Higher throughput levels can be achieved with only minimal packet loss. At a packet rate of 11,718 64-byte packet/sec, for instance, PowerHub missed only 9 out of 234,360 packets.

MultiNet, in turn, only missed 8 out of 234,360 packets. In real-world environments, higher level network protocols will compensate for a few dropped packets through resends.

MAKING THE SWITCH

The EPS-2015, with its cut-through design, took top honors in our latency tests. It's well suited to switching individual stations in workgroup environments. Additionally, each port offers full-duplex capability.

The EPS-2015, with its cut-through design, took top honors in our latency tests. It's well suited to switching individual stations in workgroup environments.

Priced at $567 per port, Kalpana's EPS-2015 is also the least expensive of the switches tested. The 15-port EPS-2015 is priced at $8,500.

LANNET's MultiNet proved adept at handling the PowerBits tests. Although its latency was affected by packet size, it exhibited minimal forwarding-decision overhead, making it suitable for multimedia applications. For a 24-port configuration (16 switched ports plus two groups of four ports), MultiNet costs $17,800.

Although the Alantec PowerHub didn't come out on top in any of our tests, it never trailed far behind. And its built-in routing capability is well suited to collapsed backbone applications.

Alantec said it is planning the imminent release of its next-generation hub, the PowerHub 7000, which should offer greater flexibility (*NW*, July 18, page 1). The hub will include features such as an expandable chassis (five to 20 slots), hot-swappable modules and up to 3.2G bit/sec backplane bandwidth. A 12-port AUI-configured PowerHub is priced at $19,800.

We understand that most sites want to incorporate switching into their existing networks, and we designed our tests accordingly. We avoided tests that required hardware or software modifications to devices on our network. For instance, we decided not to test Kalpana's full-duplex capability because it required full-duplex Ethernet adapters and special load-balancing software.

Nonetheless, these tests are instructive and shed light on the performance and capabilities of these switches.

Haugdahl is a network analysis engineer at Pine Mountain Group, Inc. in St. Paul, Minn. He troubleshoots large networks, trains end users and develops protocol analysis tools. He can be reached via the Internet at scott@pmg.com.

Letters

Continued from page 45

Fishing for a compliment

Regarding Mark Gibbs' column "Hackers revisited: definitions, ducks and ne'er-do-wells" (May 30, page 29):

I am a hacker. I have always viewed this characterization as a compliment afforded by my peers (May 30, page 29).

Searching for new alternative names for hackers is not necessary when the English language already has a perfectly good one — criminal.

Still hacking after all these years,

Mark Allen
System software analyst
Hillhaven Corp.
Tacoma, Wash.

Show and tell

Mark Gibbs' column about wireless connections (July 4, page 20) was great.

Readers want the "how tos" of wireless networking, and Gibbs' article gave a view of his personal experience riding those wireless waves.

There are tens of thousands of us surfing the wireless waves today.

Thank you for showing and telling *NW* readers about one way it can be done.

Lynne Gregg
Manager, product development
McCaw Cellular Communications, Inc.
Kirkland, Wash.

Help desk

Continued from page 2

Ron Nutter, a network systems engineer at IntraSource, Inc., a Novell Platinum authorized reseller and service center in Lexington, Ky., replies:

The only TSR utility that I know of for rebooting a NetWare workstation is Software Marketing Group, Inc.'s Lazarus. Lazarus monitors for critical errors on NetWare 2.X and 3.X networks and becomes active when it detects them.

If your network goes down or you lose your connection for any reason, Lazarus self-activates until the network is reestablished.

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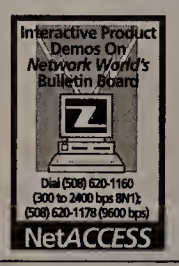

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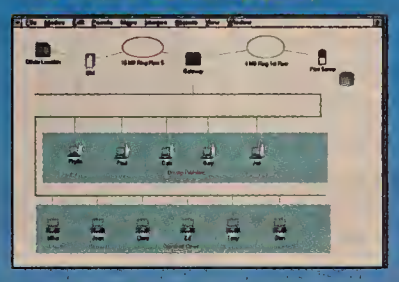

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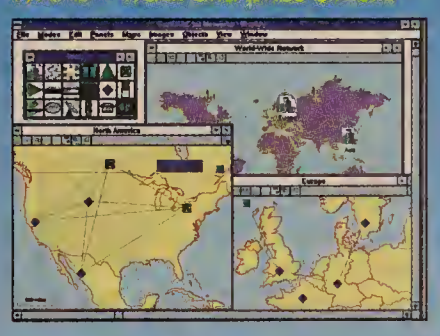

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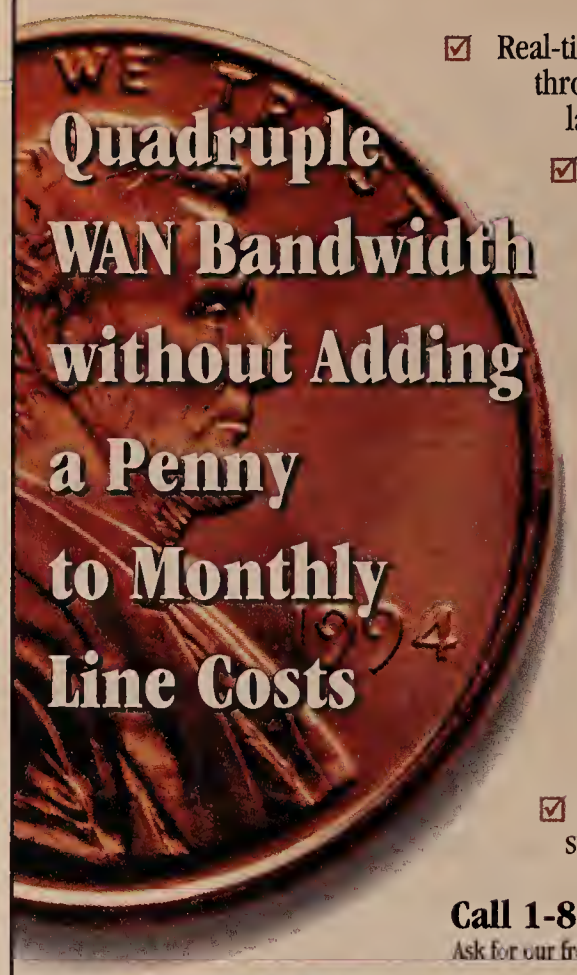

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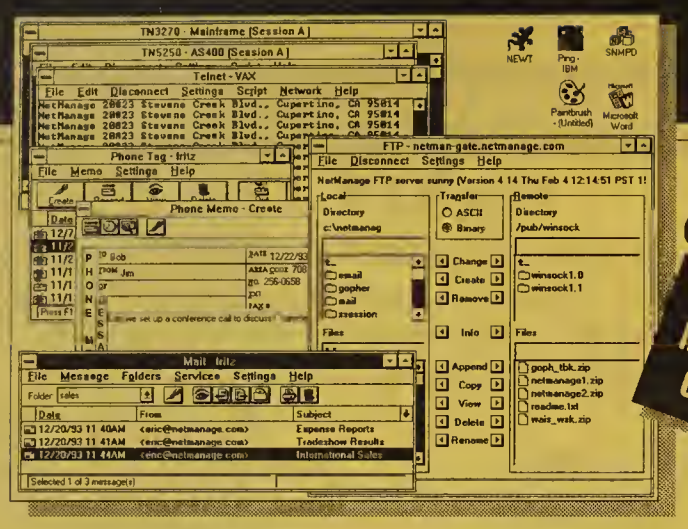

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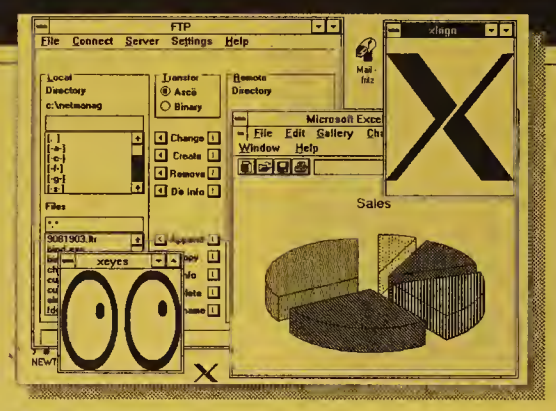

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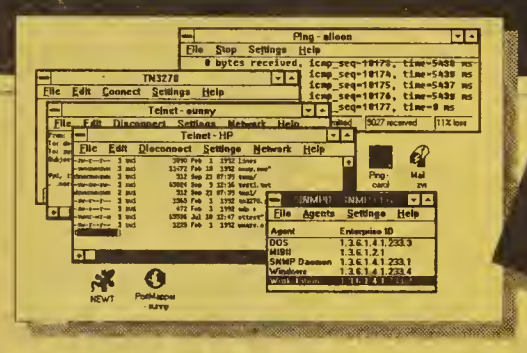

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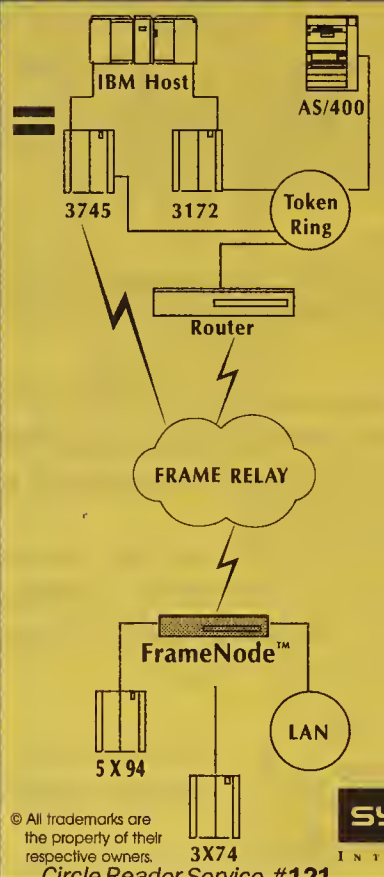

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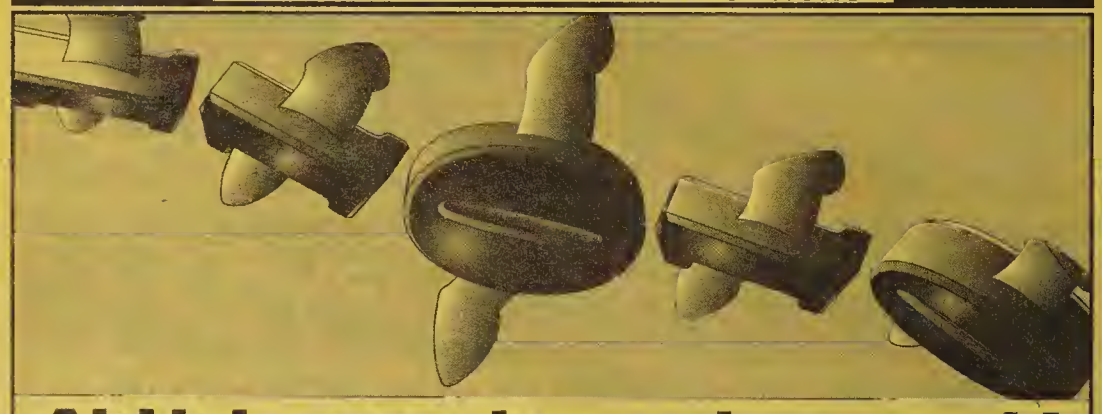

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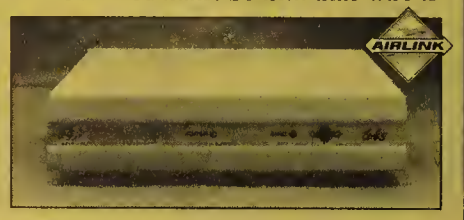

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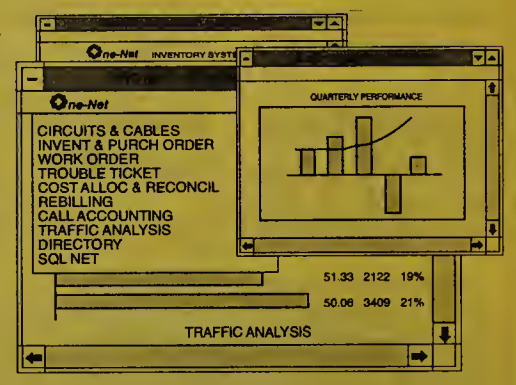

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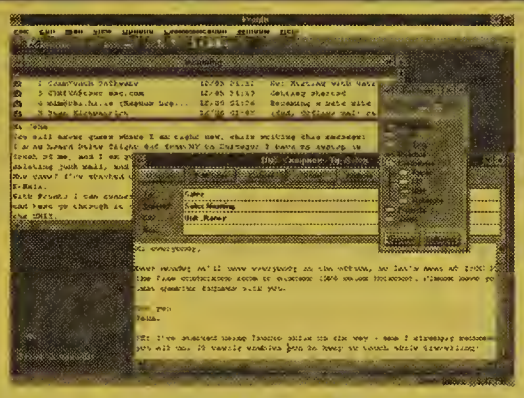

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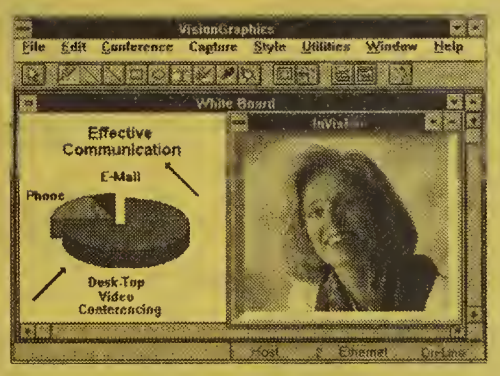

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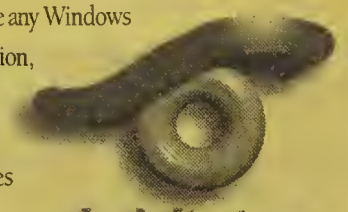

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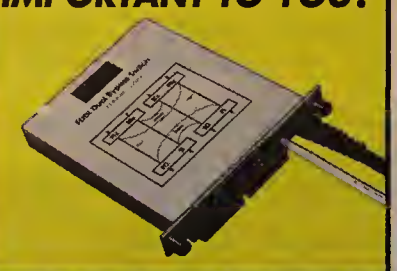

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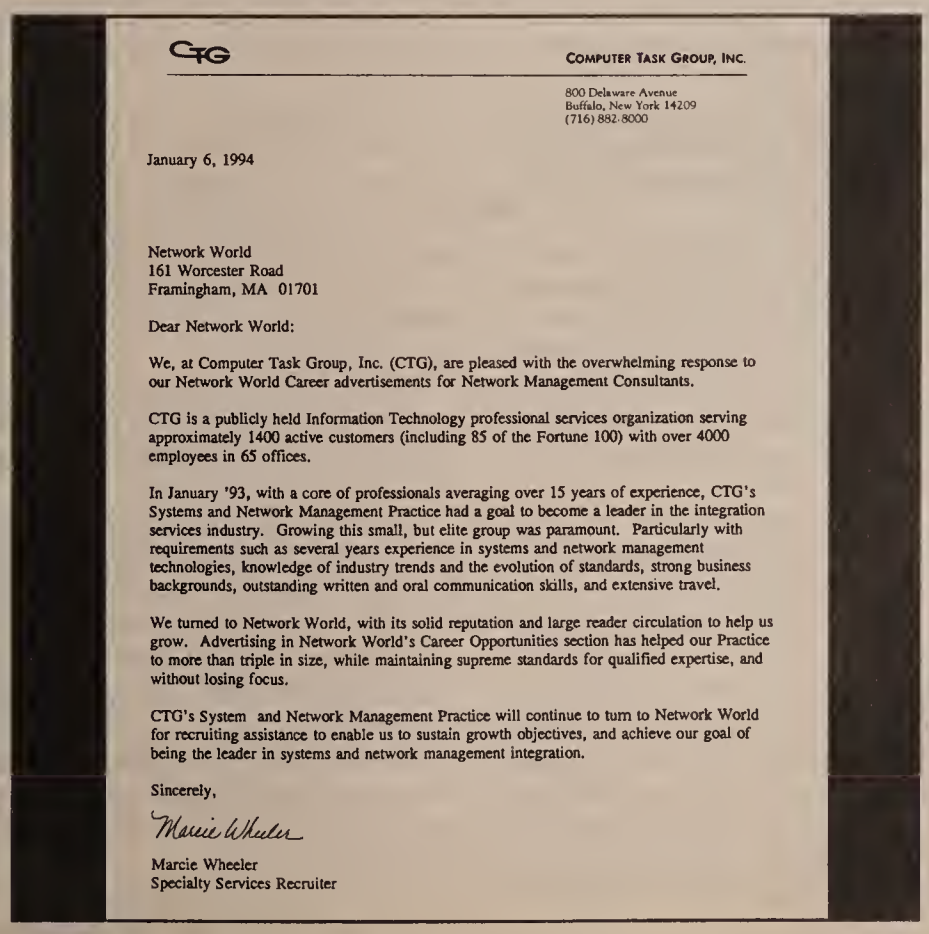

CTG

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January 6, 1994

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Dear Network World:

We, at Computer Task Group, Inc. (CTG), are pleased with the overwhelming response to our Network World Career advertisements for Network Management Consultants.

CTG is a publicly held Information Technology professional services organization serving approximately 1400 active customers (including 85 of the Fortune 100) with over 4000 employees in 65 offices.

In January '93, with a core of professionals averaging over 15 years of experience, CTG's Systems and Network Management Practice had a goal to become a leader in the integration services industry. Growing this small, but elite group was paramount. Particularly with requirements such as several years experience in systems and network management technologies, knowledge of industry trends and the evolution of standards, strong business backgrounds, outstanding written and oral communication skills, and extensive travel.

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CTG's System and Network Management Practice will continue to turn to Network World for recruiting assistance to enable us to sustain growth objectives, and achieve our goal of being the leader in systems and network management integration.

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IBM

Continued from page 1

three products for every mainframe to be managed, a single copy of the new suite will handle as many as eight mainframes.

"For users with multiple mainframes, this will save a ton of money," said Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. consultancy. "It basically gives users a software site license and lets them view an entire complex as a single entity."

and performance from local or remote systems. ESCON Manager centrally monitors and controls ESCON-based fiber-optic connections to mainframe channels. TSCF is a NetView application for monitoring communications flows from more than one MVS system.

Those applications cost up to $148,000 each, but Sysplex Operations Manager costs from $29,840 to $435,700 (see graphic).

With the new package, users will be able to combine and integrate the functions of the three applications on a single central MVS processor and control them from a single OS/2-based graphical console. Today, each application requires its own display, forcing operators to go from screen to screen to find the source of a problem and respond to it.

The lineup

Product	Function	Pricing	Availability
Sysplex Operations Manager for MVS	Integrates systems management products.	$29,840-$435,700	Aug. 26
*Automated Operations Control 3.0	Automates operations.	$1,795-$47,170	Now
*Target System Control Facility 2.0	Links to NetView.	$3,305	Now
*Enterprise Systems Connection Manager 1.3	Controls ESCON I/O.	$7,630-$148,800	Now
NetView Access Services 1.2	Automates multisystem application access.	$15,360-$58,080	Now
NetView Distribution Manager for Novell NetWare LANs	Software distribution.	NA	NA
NetView Distribution Manager/2	Software Distribution for OS/2.	NA	NA
NetView/6000 NetView Distribution Manager Agent for DOS	Software distribution.	NA	NA
Trouble Ticket/6000	Network management application.	NA	NA
Network Performance Modeler	Network capacity planner.	$20,000	Sept. 30

*Sysplex Operations Manager for MVS components
NA = Not available

The package integrates the latest versions of IBM's Automated Operations Control (AOC), Enterprise Systems Connection (ESCON) Manager and Target Systems Control Facility (TSCF).

AOC automates operator responses to common messages related to net status, operations

SIMPLIFY, SIMPLIFY

Sysplex Operations Manager components work together to ensure that the networks and other resources associated with mainframes under its watch stay up and running. For example, after the ESCON Manager reports a problem on a mainframe channel, AOC could automatically switch the traffic from that channel to a healthy one, while alerting NetView of the problem via TSCF.

The downside to the announcement is that the Sysplex Operations Manager requires the latest and most expensive versions of each of its three software components, analysts said.

Still, users at The World Bank in Washington, D.C. like the idea behind the package. "This is a very big issue for us, as we are trying to reduce operations costs — especially on the IBM equipment — and we are looking to automation and integrated solutions to do that," said Monika Quigley, an information officer at the bank. "We are in the preliminary stages of evaluating IBM, Digital Equipment Corp. and LEGENT Corp. offerings but haven't made a decision yet."

On the software distribution front, IBM is rolling out NetView DM for NetWare, a NetWare Loadable Module for NetWare servers that will let users employ mainframes to distribute NetWare files, operating system revisions and other data to NetWare servers.

NetView DM is IBM's mainframe-based software distribution product for Systems Network Architecture nets.

"This is a significant announcement because it represents the first time IBM has put NetView functionality into a non-IBM box," said Anura Guruge, an independent analyst based in New Ipswich, N.H. "Well over 70% of SNA shops have NetWare LANs, so this product answers a big user need."

Lionel Geltman, assistant vice president of Nomura Research Institute America in New York, said updating software on the 50-plus NetWare local-area networks in his firm has always been an expensive, labor-intensive job.

"We would have to send someone to all our remote sites or have an experienced person onsite to do software updates," he said. "The fact that we'll be able to do this once, from a central location, is wonderful."

IBM will also introduce a new version of NetView DM/2 that will reduce operational costs. NetView DM/2 Version 2 Release 1 will let users designate one OS/2 node as the central software distribution server in large OS/2-based nets.

Today, multiple NetView DM/2 nodes must be deployed for distributing software updates to devices on a large LAN. IBM announced similar functionality for the RISC System/6000-based version of NetView DM last month (*NW*, June 13, page 1).

The new version of Trouble Ticket/6000, to be announced this week, will be able to gather data from Oracle Corp., Sybase, Inc. and Informix Software, Inc. databases when building trouble tickets.

Today, Trouble Ticket/6000 can only work with the Ingres database and the flat-file database that comes with the NetView/6000 platform.

Also on IBM's plate this week:

- A REXX application program interface for IBM's NetView Access Services application. Access Services let users simultaneously log on to multiple mainframe applications, such as CICS and IMS. The REXX interface will let users write improved automation routines.
- A DOS agent that lets NetView DM/6000 distribute software to DOS clients on a Transmission Control Protocol/Internet Protocol network.
- A Network Performance Modeler for OS/2, a capacity planning and network performance modeling tool.

Comments?

See "Contacts" box on page 2.

Oracle

Continued from page 1

crop of products emerging from small firms to help users get a handle on distributed database management.

Another company, Micromuse plc in London, recently discussed plans for an object-oriented and SNMP-based tool for handling Oracle databases (*NW*, July 11, page 1).

Users and analysts said the emergence of database management tools is promising, but they questioned just how practical some of these tools will be. Some of the products assume that systems administrators have broad knowledge of both databases and nets, a rare combination, said Tom Nolle, president of consultancy CIMI Corp. in Voorhees, N.J.

And then there are the limitations of SNMP, on which many of the products are based. "Can you imagine someone trying to communicate what needs to be done to a relational database via SNMP?" Nolle asked.

TAKING CONTROL

ISG and Digital Analysis are working to meet users' immediate database management needs.

ISG's Control Center, available in the fourth quarter, is a Windows application for monitoring Oracle and Digital Rdb databases running on Digital VAX/VMS systems, as well as IBM and HP Unix systems. The software lets net administrators identify all databases on the network and monitors their performance via Transmission Control Protocol/Internet Protocol at regular intervals, said Eli Azoulay, ISG's vice president of sales and marketing.

Control Center will issue warnings to systems administrators and suggest tuning options such as moving tables or adding additional table space. Administrators can adopt Control Center's tuning recommendations or implement their own.

ISG said it plans to support Sybase, Inc. and Informix Software, Inc. databases in future versions. Control Center will eventually support SNMP, as well.

Pricing has not been set for Control Center.

Digital Analysis' Oracle Proxy is an SNMP agent designed to sit with Oracle databases on servers from IBM, HP or Sun Microsystems, Inc. The agent, based on a proprietary SNMP Management Information Base, monitors disk I/O, table space utilization and alert logs on Oracle databases.

Net administrators sitting at IBM NetView/6000 or HP OpenView management stations can use their MIB browsers to tap the agent for information. To quell problems identified by the agent, net administrators can issue SQL statements to the agent via TCP/IP links.

The firm is also working on a Unix-based management console component, expected out next year, for administrators who do not have NetView/6000 or OpenView. Also in the works are Informix and Sybase agents.

Oracle Proxy, available in October, will cost $4,000.

✆ISG: (804) 794-0354; Digital Analysis: (703) 476-5900.

3Com

Continued from page 6

security servers gives net managers better control over users trying to dial in since they are cleared through a single device and not dialing into multiple servers.

3Com will also provide support for a new suite of remote clients, including Microsoft Corp. Windows and IBM OS/2 nodes, as well as new Microsoft and Apple Computer, Inc. clients such as the beta versions of Windows 4.X, dubbed Chicago, and Windows NT, codenamed Daytona.

The company will also support the 2.0 version of the AppleTalk Remote Access Protocol (ARAP). Previously, AccessBuilder supported DOS- and Unix-based clients.

"One of the reason we went with 3Com was because of the company's plans to support just about every client you could think of," EBT's Rich said. "The ARAP 2.0 support is a welcome feature because we were having trouble with AppleTalk users getting disconnected with ARAP 1.0."

A new dial-out capability for AccessBuilder is also expected to be rolled out this week — a feature Rich said will likely help him reduce network costs.

"Dial-out features will let me pool my modem and phone lines together instead of dedicating individual lines and modems to each remote office," he said. "That will allow me to initiate some significant cost savings."

3Com's Access Builder 5.0

Maximum number of ports	16
Port speed	115.2K bit/sec
Bridging	Yes
Routing	Yes
Network protocols	AppleTalk, DECnet, IP, IPX, NETBEUI, NETBIOS, VINES and XNS
Serial line protocols	ARAP 2.0, PPP and SLIP
SNMP support	Yes
Price (16-port configuration)	$6,295

Taken as a whole, the AccessBuilder enhancements allows 3Com to cover a lot of ground, according to Brad Baldwin, principal and senior consultant for Baldwin Network Research in Fremont, Calif.

"These remote access devices are proliferating at an amazing rate, and with this announcement, 3Com is telling users it doesn't care what you have in the remote offices; it will support it," Baldwin said.

"The management improvements will also be welcomed by users since they want a product they can set up and manage remotely, eliminating the need to send experienced technicians to a distant location," he continued.

All upgrades will be available in the third or fourth quarter. Prices for AccessBuilder range from $3,495 to $7,295, depending on configuration.

✆3Com: (408) 764-5000.

Army

Continued from page 1

mined that ATM and Synchronous Optical Transfer technology will be the preferred net infrastructure technologies at large Army sites in the future, according to Lt. Col. Greg Swanson. He is the Army's product manager for both the widely used Defense Data Network and the new ATM project, dubbed the Common User Installation Transport Network (CUITN).

WALTER CALAHAN

DAWSON

"The government is looking at ATM on the battlefield in the future," Swanson said. "What we're providing is a seamless interface to ultimately support forward troops through an ATM connection between the sustaining base and the wide-area network."

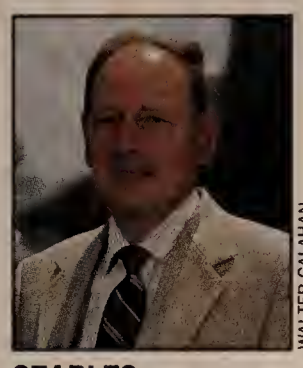
ATM BRAGGING RIGHTS

The ATM network going up at Ft. Bragg was designed by the Information Systems Engineering Command (ISEC) at Ft. Huachuca, Ariz., a technical team that has set up laboratories for ATM interoperability testing and deployment to serve Army sites worldwide.

The Ft. Bragg net will be anchored by a pair of Optical Data Systems, Inc. (ODS) Infinity hubs, each housing a Newbridge Networks, Inc. 3615 ATM switch capable of switching net traffic at up to 2G bit/sec and a Cisco Systems, Inc. 7000 router with an ATM interface.

The ODS hubs will sit in the middle of a fiber optics-based star network extending to as many as 28 other ODS Infinity hubs. These hubs, referred to as "area distribution nodes" by the Army, will each house a Cisco 7000 router as well as FDDI, Ethernet and token-ring cards as needed. Each of these nodes will support LAN interconnection for as many as 18 buildings, each of which will have its own ODS hub for in-building traffic.

More than 100 buildings out of the 5,000 at Ft. Bragg are now up on the ATM net, said Frank Dawson, chief of plans for the directorate of information management at the base. That adds up to about 600 users.



WALTER CALAHAN

STAPLES

The decision to move to ATM over FDDI was a matter of dollars, speed and scalability, said Bill Ryberg, the CUITN product leader at Ft. Monmouth, N.J.

According to Army estimates, FDDI could only deliver 334K bit/sec to each of the 288 Ethernet LANs on a base the size of Ft. Bragg, while ATM can deliver up to 7.5M bit/sec to each LAN simultaneously. And the ATM network would only cost about 2% more, the Army said.

"We found that the cost-performance ratios for ATM exceed any network technology available," Ryberg said.

John Staples, senior CUITN engineer at Ft. Huachuca's ISEC, said ATM is also scalable, whereas FDDI is not.

The great likelihood that the Army will venture into applications such as desktop video-conferencing in the future demands that the underlying network support growing bandwidth needs, he added.

Ft. Bragg will manage its new network with Hewlett-Packard Co.'s OpenView network management system as well as with management applications from ODS and Cisco.

One outstanding issue regarding the ATM deployment is how to interconnect the metropolitan nets. That's a decision that will be left to the Defense Information Systems Agency (DISA) in Alexandria, Va.

"No doubt DISA will rise to the occasion," Swanson said.

ATM on the front line

Future U.S. soldiers may have access from the trenches to up-to-the-minute military intelligence as well as images of battlefield and weather maps via Asynchronous Transfer Mode (ATM), thanks to a network test in progress in Fort Huachuca, Ariz.

The test will involve using ATM technology in conjunction with satellite, microwave and other wireless communication forms.

The proposed network, being put to the test at the Defense Information Systems Agency's (DISA) Joint Interoperability Test Center, would connect battlefield units to command centers to allow quicker access to and wider distribution of tactically important information.

"We will see how ATM can be used in the battlefield to move all this information around, be it video, voice, data, whatever," said George Whitehead, program manager at the center.

The center's ATM work will culminate in a comprehensive test in December that will tie together Army, Navy and Air Force command centers.

The test center's overall goal is to assess how ATM can be used in the Department of Defense's tactical communications systems. The department uses a variety of noisy narrowband media, such as satellite communications, and is interested in whether ATM can adapt to them, Whitehead said. To find out, the center is testing the effect on ATM of error-correction techniques used to cope with radio transmission problems such as fading and burst errors.

The center is also studying the effect of encryption techniques on ATM performance.

The Defense Department plans to use the Humvee — the Army's updated jeep — to haul ATM switches to the front.

BY BILL BURCH

Comet

Continued from page 10

every possible file in case they could not get back in.

By Thursday, more than 100,000 connections had been made to the Jet Propulsion Laboratory's (JPL) main WWW server in Pasadena, Calif., and a second one brought on-line Monday to support the demand, a spokesman said.

Before the second Sun Microsystems, Inc. SPARC 2 server went on-line, Internet users reported waiting as long as two hours to get into the first system over JPL's T-1 connection or to an alternative site at Johns Hopkins University in Maryland.

Observatories from South Africa to Maryland also quickly created file libraries of photographic and digital images, as did a number of Internet public access providers and universities.

LAN OVERLOAD?

While the event was an impressive display of how the Internet is changing the way people get information — going right to the news source, instead of waiting for traditional delivery via broadcast TV or newspapers — it should serve as a wake-up call for corporate net managers.

"If you suddenly have all that stuff available to 2,500 people, what happens?" asked Charles Wolverton, who is overseeing efforts at Aerospace Corp. in El Segundo, Calif., to use WWW technology for internal information dissemination.

Wolverton said it is possible to keep Internet access links free by making copies of images and storing them locally.

Phillip Dent, technical instructor at Auto-trol Technology Corp. in Denver, said one solution, at least for nets with Unix servers, is setting disk quotas, which prevent users from storing more than a preset amount. "Users really hate it," but it forces them to minimize their disk use, he said.

But Dave Hayes, who set up the campus net at Southern Methodist University, said that approach should only be used as a last resort. Many users simply do not realize they are clogging disks or nets and will stop if asked politely.

If managers set an arbitrary limit for everybody, "the users can become infinitely creative in getting around it" and become hostile toward net managers, he said.

TV GOES BOOM

Besides delivering images directly to users, the Internet played a role in bringing the scene to public television viewers. PBS television station WHYY in Philadelphia produced a live broadcast of the event using an Internet link, satellite dishes and a videophone to bring together multiple images and experts for an interactive program shared with other PBS stations around the country.

Live Internet electronic mail from observatories scrolled on the screen, although at one point, it scrolled over an image of an impact made by a comet fragment.

"This is a perfect example of how these different media can be combined and enhanced even in a broadcast environment," said Bill Weber, vice president of network technology and engineering for WHYY.

WHYY used a Cisco Systems, Inc. 2500 series router and a 1.5M bit/sec T-1 data service unit/channel service unit from ADC Kentrox to access the Internet. Image file size ranged from 80K bytes to 600M bytes.

An interview with Arthur Clarke in Sri Lanka was conducted over a pair of AT&T Model 2500 Videophones modified by the Massachusetts Institute of Technology for television format.

The Model 2500 uses a standard phone connection to transmit still images that are refreshed about every three seconds.

Senior Writer Michael Csenger contributed to this story.

INTERNET tip

BY ADAM GAFFIN

One in a series of occasional tips on Internet-based information services.

Comet images on the Internet

Images of Shoemaker-Levy 9's impact on Jupiter are available via several routes over the Internet. They include:

World-Wide Web:

Point your Web browser at http://seds.lpl.arizona.edu/sl9/sl9.html or http://navigator.jpl.nasa.gov/sl9/sl9.html.

Anonymous FTP:

dept.physics.upenn.edu in the /SL9 directory or marvel.stsci.edu in the /stsci/epa/comet directory.

Gaffin can be reached via the Internet at agaffin@world.std.com.

NETWORK WORLD

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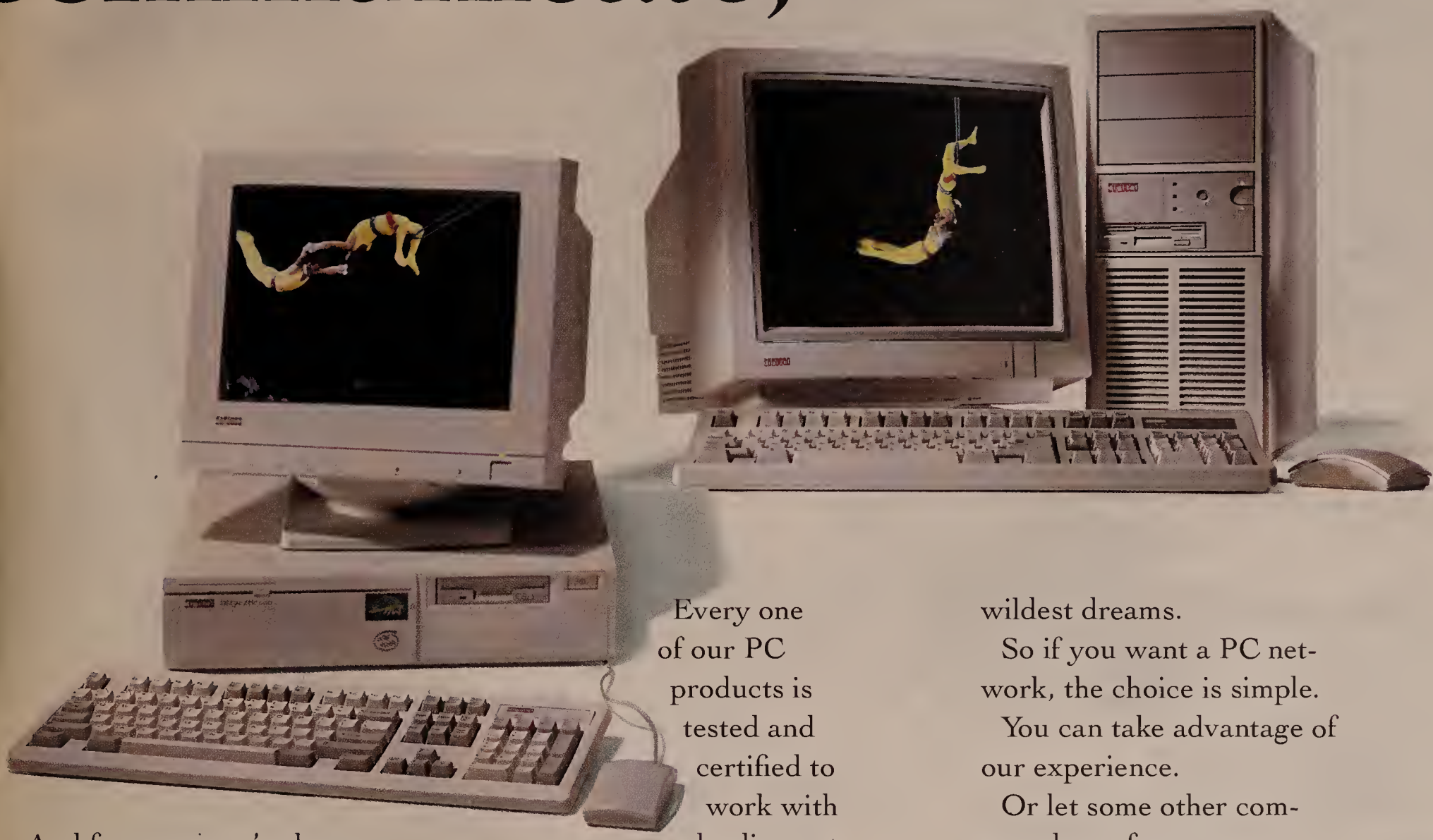

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